

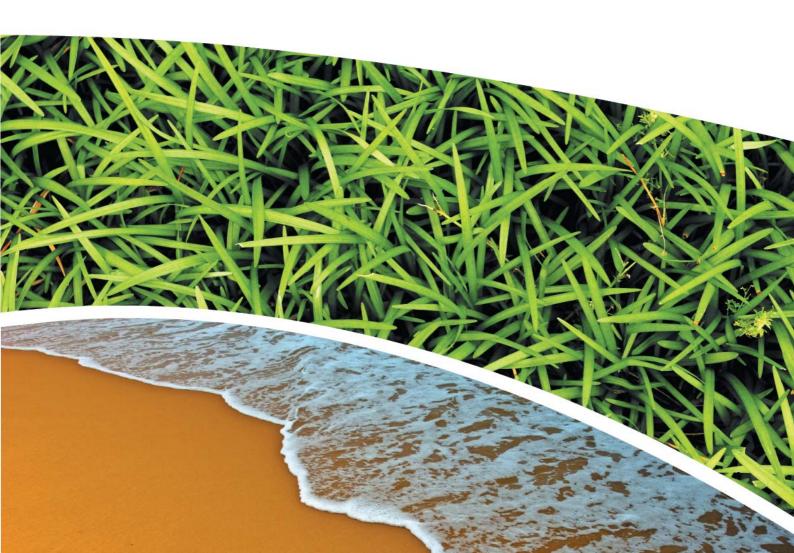


BASELINE CONTAMINATION ASSESSMENT

Proposed Concrush Facility Expansion, Racecourse Road, Teralba

Prepared for Concrush Pty Ltd Prepared by RCA Australia RCA ref 13589-401/3 NOVEMBER 2018





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RCA ref 13589-401/3



08 November 2018

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Geotechnical Engineering

Engineering Geology

Environmental Engineering

Hydrogeology

Construction Materials Testing

Environmental Monitoring

Sound & Vibration

Occupational Hygiene

BASELINE CONTAMINATION ASSESSMENT PROPOSED CONCRUSH FACILITY EXPANSION RACECOURSE ROAD TERALBA

EXECUTIVE SUMMARY

This report presents the findings of a baseline contamination assessment undertaken on soils and groundwater in currently vacant land adjacent to Concrush on Racecourse Road, Teralba (Lot 2 DP 220347). The assessment was undertaken at the request of Mr Lachlan Sweeney on behalf of Umwelt (Australia) Pty Ltd and Concrush Pty Ltd.

It is understood that Concrush is intending to develop the land, which is a former metal recycling facility, to facilitate the expansion of the processing facility for the currently operating facility at 21 Racecourse Road, Teralba, which is adjacent to the north of the site.

The purpose of the investigation is to determine the suitability of the site prior to purchase/development of the site. The objective of this investigation is to provide advice on the suitability of the site for the proposed development with regards to contamination potential in accordance with SEPP 55 (Ref [1]) and address the SEARs (Ref [2]).

A soil contamination assessment (Ref [4]) was undertaken by Coffey to support a Development Application submitted to Lake Macquarie City Council. The objective of the assessment was to provide a baseline contamination status for the site. A total of seventeen (17) test pits were excavated in an approximate 20m grid across the site. Soil samples were collected from within fill material along with additional samples of potential asbestos containing material fragments. Samples were analysed for a range of potential contaminates of concern including hydrocarbons, metals, pesticides and asbestos. Chrysotile asbestos was detected in all the additional samples.

Coffey prepared an Environmental Site Management Plan (ESMP, Ref [5]) to address a requirement of Lake Macquarie City Council prior to an issue of Development Application for an industrial subdivision. The ESMP (Ref [5]) was to be utilised by the site subcontractor in conjunction with an occupational hygienist to manage the asbestos contamination. The ESMP (Ref [5]) included the placement of a marker fabric layer under the capping layer.

An environmental scientist experienced in the handling of potentially contaminated soil undertook the fieldwork on 18 June 2018. The scope of work included:

- A site inspection.
- Location of services.
- The collection of forty three (43) soil samples from thirteen (13) locations on the site:
 - Soil samples were collected by excavator at eleven (11) locations with specific targeting of soil stockpile mounds on the southern portion of the site and by track mounted drill rig utilising solid flight augers at two (2) locations situated on the south portion of the site.
 - Samples were collected from fill and natural materials from between depths of approximately 0.1 and 4.0 metres below the existing ground surface.
 - All samples were assessed with a photoionisation detector (PID) for the presence of volatile compounds and to assist in the sample selection process.
 - Sampling depths were determined in the field based on material types encountered and evidence of visual and olfactory contamination.
- Installation of two (2) groundwater monitoring wells.
- Submission of twenty two (22) samples covering a range of soil types and depths for laboratory analysis of TRH, BTEX, PAH, phenols, cyanide, metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury), asbestos and acid sulfate soils.

No gross contamination issues were identified on the site or within the surrounding areas during fieldwork, although stockpiles of concrete and metal were scattered throughout the site, with concrete, metal and other anthropogenic materials observed within the test pits. Potential asbestos containing material (ACM) fragments were observed in several of the test pits, though no ACM was observed on the ground surface or within stockpiles during the current investigation. PID readings of all samples report did not report any detection of vapours.

In summary, TRH, BTEX, PAH, phenols, cyanide and metals concentrations were either not detected or were detected at low concentrations below the relevant criteria with the exception of:

- Sample BH2/a which reported benzo(a)pyrene in excess of the ASC NEPM (Ref [6]) ecological screening levels.
- Samples BH1/a, TP7/a, TP8/a, TP9/a, TP9/b and TP12/b which reported zinc in excess of the ASC NEPM (Ref [6]) ecological screening levels.

Asbestos was not detected in the majority of samples. Chrysotile asbestos was detected within bonded material fragments from TP7, TP8 and TP9.



Acid sulfate sample field pH (pH_F) of all samples tested was greater than 4 and, as such, the soils would not be classified as actual acid sulfate soils.

The pH after oxidation (pH_{FOX}) of all soil samples tested less than 4 and there was a significant drop in pH from field value and, as such, net acid generating ability is considered likely and the soils would be considered to be PASS and if exposed is likely to generate acid leachate causing potential environmental degradation risk.

No soil or groundwater contamination was found in excess of the commercial/industrial human health criteria relevant for the current or future site use. Asbestos was confirmed to be present within the identified fragments, however asbestos fibres were not identified within the soil.

RCA considers based on the current investigation the site is suitable for the proposed commercial/industrial development provided the stockpiles of fill, concrete and metal are characterised for onsite reuse or classified for offsite waste removal (or otherwise) prior to the proposed expansion. The development of a construction management plan to address, in particular the asbestos onsite, which will include but not limited to the recommendations of a maker layer placed across the entire site, in line with the ESMP (Ref [5]) with reference to SafeWork NSW. If the development requires excavation works into natural soils to depths near the groundwater table an acid sulfate soils, an ASSMP will be required.



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1 INTRODUCTION

Concrush Pty Ltd (Concrush) is seeking development consent to increase the processing and storage capacity of the existing resource recovery facility located on part of Lot 2 DP 220347 at 21 Racecourse Road, Teralba, NSW. The *Concrush increase to capacity project* (the Project) will involve alterations and additions to the existing facility in order to provide greater on-site storage capacity that is sufficient for the increased level of throughput.

The Project is a State Significant Development (SSD) and requires approval under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for which the Minister for Planning is the consent authority.

This report presents the findings of a baseline contamination assessment undertaken on soils and groundwater in currently vacant land (the site) adjacent to the existing Concrush facility. **Drawing No. 1**, **Appendix A** presents the location, boundary and general layout of the site under investigation. The assessment was undertaken on behalf of Umwelt (Australia) Pty Ltd and Concrush. The current Concrush facility which borders the north of the site is shown on **Drawing No. 1 and No. 2**, **Appendix A**.

The objective of this assessment was to assess the suitability of the site and establish baseline conditions prior to the proposed development with regards to contamination potential and associated risks in accordance with SEPP 55 (Ref [1]) and to address the requirements of the Secretary's Environmental Assessment Requirements (SEARs, Ref [2]).

This report has been reviewed and approved by Mr Adam Sullivan, a certified site contamination specialist (CEnvP-SC: certification No. SC40944).

1.1 THE PROPONENT

The proponent for the Project is Concrush. Concrush was established in 2002 after recognising the need for a construction and demolition recycling facility in the Lake Macquarie region. Concrush is a locally owned and operated business based at Teralba.

The Concrush facility accepts concrete, asphalt, bricks, pavers, roof tiles, wall and floor tiles, rock, sand, plasterboard and green waste from domestic households and the commercial industry. These materials are then recycled into specification and non-specification quality products such as: roadbase, drainage aggregates, pipe bedding and haunch, packing fines, decorative aggregates and mulches. These products are used within the civil and construction industries or for commercial, domestic and household applications.

1.2 DESCRIPTION OF THE PROJECT

Concrush is seeking an increase to the processing and storage capacity of the existing facility. Concrush currently recycles approximately 108,000 tonnes of waste material per annum and is seeking approval for an increase in throughput capacity to up to 250,000 tonnes of waste material recycled per annum, including both construction and demolition waste and green waste. Concrush will require a waste storage capacity on-site that is sufficient for this level of throughput.



The Project will be constructed over two (2) stages to allow for the proposed Project elements to come online as required in line with increasing production.

A description of the individual elements of the proposed Project including additional plant and equipment are summarised below.

 Table 1
 Proposed Project Components

Component	Description			
Hardstand areas	Hardstand areas to be constructed for material processing areas and stockpile areas (will require some site levelling). Hardstands will consist of 200 millimetre thick recycled road base). Internal access roads will have a two (2) coat seal.			
Material Processing Areas	Processing areas for the crushers and screens.			
Waste and Product Stockpile Areas	Waste and product stockpiles will be established with a stockpile height of up to ten (10) metres (m). It is anticipated that up to 150,000 tonnes of material will be stored onsite.			
Upgrade of existing facilities	The existing weighbridge, office, lunch room and maintenance shed will be upgraded and/or relocated.			
Waste Tracking System	The existing Wasteman software will be used to track details of all inbound and outbound loads.			
Production Compound	The relocated lunch room, toilet and maintenance shed will be grouped together to formed a compound for production staff.			
Retail Area	This area will be restricted to light vehicles and small trucks and will include an area for tipping and an area containing concrete bays of products for sale.			
Storage Bays	Concrete walls and concrete storage bays will be constructed using 1m ³ concrete building blocks.			
Concrete Walls	A two (2) metre high concrete wall will be constructed close to the southern Project site boundary using 1m³ concrete blocks. The wall will prevent stockpiled material encroaching on swale drains and moving offsite. Concrete walls may also be used to delineate other areas of the site.			
Green Waste Pasteurisation	An aeration system using four electronically driven and computer controlled fans to push air through movable perforated pipes underneath the pasteurisation piles will be implemented in the green waste area. This system allows more control of oxygen levels in the pasteurisation process compared to the traditional turnover process.			
Wheel Wash	A vehicle wheel wash bay will be constructed immediately after the exit weighbridge to reduce tracking of material onto public roads.			
Concrete Washout Bay	A wet concrete washout bay will constructed consisting of a bunded, impermeable area with an isolated catchment. Wet concrete and agitator washout will be captured in the concrete washout bay.			
Water Management System	The existing Water Management System (WMS) will be upgraded involving resizing of existing sediment basins, new sediment basins, swale drains and a leachate dam and artificial wetland to treat nutrient runoff. Water tanks and associated poly pipe and pumps will be installed to allow			
	collection and re-use of stormwater for dust suppression.			
Trommel Screening Machine	Addition of a Trommel screening machine for sorting of green waste.			
Primary Jaw Crusher	The primary jaw crusher will be replaced.			
Perimeter Landscaping - Mounds, Fencing and Lighting	Landscape mounds will be established on the perimeter to reduce visibility. 1.8m high security fencing and security lighting are also to be installed.			



Component	Description		
Utilities	The existing Ausgrid connection is via a power pole in the north east corner of the Project area. The power supply will be extended to the south west corner of the site via an underground connection.		
Pug mill	A pug mill may be installed in the future to allow fast mixing of materials to produce products such as road base.		
Ballast wash facility	A processing area may be dedicated to a ballast wash facility to allow for processing of rail ballast.		

1.3 PROJECT STAGING

It is anticipated that the volume of materials recycled and products sold will increase over a period of time up to the maximum production level of 250,000 tonne per annum (tpa). It is understood that it is proposed to stage the Project by undertaking some elements of the site upgrade early and implementing other elements of the Project as required when a certain production level is reached. Two (2) Project stages and the associated approximate production level have been identified as follows:

- Stage 1 upon receipt of all approvals required for the Project.
- Stage 2 at approximately 200,000tpa up to 250,00tpa.

The key components of the two (2) Project stages are described below.

Stage 1

Stage 1 would be implemented immediately following project approval. The key elements of Stage 1 are:

- Construction of all hardstand areas (processing areas and waste and product stockpiles).
- Creation of the retail area.
- Widen site access and install sliding gate.
- Re-configuration of existing exit only weighbridge to allow for vehicle exit and entry to facilitate entry to the site.
- Construct production compound by relocating maintenance shed and lunch room and toilet.
- Augment the existing water management system to incorporate the leachate dam, constructed wetland, sediment basins, drainage swales, flood mitigation bund, water storage tanks, sprinkler systems.
- Establish wheel wash, landscaping mounds, fencing, power upgrade and lighting.
- Two (2) coat seal of internal access roads.
- Replace primary jaw crusher.

Stage 2

Stage 2 would be implemented when production reaches approximately 200,000tpa up to the Project limit of 250,000tpa. The key elements of Stage 2 are:



- Relocation of the existing exit weighbridge, construction of a new entry weighbridge and establishment of the new weighbridge office.
- The existing entry weighbridge becomes the retail area weighbridge and the existing weighbridge office becomes the retail area weighbridge office.
- Construction of a new exit onto Racecourse Road from the retail area for light vehicles (less than two (2) tonnes) only.
- Establish pug mill.
- Establish ballast wash facility.
- Establish trommel screening machine for green waste.
- Establish aeration system for green waste pasteurisation.

2 SITE IDENTIFICATION AND DESCRIPTION

The site is identified as part Lot 2 DP 220347 at Racecourse Road, Teralba. Drawing No. 2 presents details of the site boundary, lot boundary and the existing Concrush facility. Additional site details are shown in **Table 2**.

Table 2Site Details

Current zoning (Ref [3])	IN1 – General Industrial	
	Current: Vacant/unused land	
Current and proposed use	Proposed: Expansion of existing Concrush facility (see Section 1.2).	
	Approximately 2.4ha	
	Investigation area – approx. 1.7ha	
Size of site	The northeast portion of the site (approximately 0.7ha as shown on Drawing No. 1 and No. 2) was previously investigated by Coffey (Ref [4]).	
Surrounding land use to the:		
North	Industrial – current Concrush facility.	
South	Industrial	
East	Racecourse Road and then Cockle Creek	
West	Main Northern Rail line and wetlands	
Nearest sensitive receptor (human health)	Residential housing located approximately 360m south east across Cockle Creek.	
Nearest sensitive receptor (environmental)	Cockle Creek located approximately 35m east and a waterbody approximately 30m west	

Drawing 1, **Appendix A** shows the locality of the site.



3 SITE HISTORY AND BACKGROUND INFORMATION

No specific appraisal of site history was undertaken as part of this report, however a review of a previous contamination investigation and associated plans for a proposed industrial subdivision was conducted, as summarised below. The proposed industrial subdivision did not proceed.

3.1 Coffey 2013

A soil contamination assessment (Ref [4]) was undertaken by Coffey. The objective of the assessment was to provide a baseline contamination status for the site. Coffey undertook a review of site topography, geological and hydrogeological information, field investigations including test pitting and soil sampling, laboratory analysis of selected samples, data assessment and preparation of a report.

A total of seventeen (17) test pits were excavated in an approximate 20m grid across the site (Figure 2, Ref [4] included in **Appendix A**). Soil samples were collected from within fill material along with additional samples of potential asbestos containing material (ACM) fragments. Coffey stated that "A number of fragments of potential Asbestos Containing Materials (ACM) were observed to be scattered across the surface of the site". No information was provided regarding the physical state of the fragments. Soil samples were analysed for a range of potential contaminants of concern including hydrocarbons, metals, pesticides and asbestos. All analysed soil samples met the commercial/industrial land use criteria adopted at that time in 2013. No asbestos was detected in soil samples, however, chrysotile asbestos was detected in the ACM fragments subjected to analysis. Summary results tables from the Coffey report are presented in **Appendix B**.

The site was proposed to be filled with at least 0.5m of imported fill at the time of the Coffey assessment (Ref [4]). The report stated that due to the presence of asbestos on the surface, the site re-development would need to be appropriately managed.

Coffey considered the site to be suitable for commercial/industrial use, providing:

- Imported fill was classified as either Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM).
- An Asbestos Management Plan (AMP) prepared by a suitably qualified consultant or occupational hygienist was implemented prior to and during earthworks to fill the site.
- A Site Management Plan (SMP) was prepared following filling, which advised that asbestos was present at depth and outlined management methods for future excavations that may extend through the surface cap and into underlying fill.

Coffey (Ref [4]) noted that should the proposed filling not proceed, additional works may be required depending on the proposed future use of the site.

RCA considers the previous investigation to be suitable for the assessment of the area investigated by Coffey and defined by their objectives, due to sufficient characterisation of soils and appropriate management strategies recommended.



3.2 Coffey 2014

Coffey prepared an Environmental Site Management Plan (ESMP, Ref [5]) to address a requirement of Lake Macquarie City Council prior to issuing the Development Application consent, which was approved¹, for an industrial subdivision. The ESMP (Ref [5]) was to be utilised by the site subcontractor in conjunction with an occupational hygienist to manage the asbestos contamination. The ESMP (Ref [5]) included the placement of a marker fabric layer under the capping layer.

The objective of the ESMP (Ref [5]) was to outline the procedures and management measures to be undertaken during the construction of the cap, to protect construction worker health and the environment, and to ensure that the cap provided a suitable barrier to contamination.

No further contaminant information was provided in the ESMP (Ref [5]).

3.3 REGULATION OF CONTAMINATION

Lot 2 DP 220347 is listed on the NSW Environment Protection Authority (EPA) register of sites declared as significantly contaminated under the *Contaminated Land Management Act 1997* (CLM Act). The notified area was occupied by Metal Salvage at the time of the declaration notice in 1998 and is located in the southern portion of Lot 2 DP 220347 as shown on **Drawing 2**, **Appendix A**. The notified area is located approximately 150m to the south of the site under investigation for this assessment.

Information provided in the site declaration notice (Section 35 Notice Number 483 UB3133) states that the Metal Salvage property was inspected in 1996 and 1997 by the NSW EPA and numerous areas were identified to be contaminated with hydrocarbons, foundry sand suspected of being contaminated with heavy metals, PAH, phenols and cyanide, along with material suspected of containing heavy metals used as fill on the premises. Numerous drums containing oils, fuel and other chemicals were stockpiled on the premises. No investigation reports or analytical results were available for review, as such the nature and degree of contamination within the notification area is not known.

3.4 GEOLOGY AND HYDROGEOLOGY

RCA reviewed published geological and hydrogeological maps and summarise the findings in **Table 3**.

¹ Based on Lake Macquarie website accessed 17 August 2018





 Table 3
 Geology and Hydrogeology

Soil type	Quaternary Alluvium deposits consisting of sands, silts, gravels and clays.	
Geology type	Permian aged Newcastle Coal Measures of coal, tuff, conglomerate, sandstone and shale of the Moon Island Beach Sub-Group.	
Acid sulfate soil	According to Wallsend acid sulfate soils risk map there is a high probability of acid sulfate soil materials at or near the ground surface.	
Groundwater use	Seven (7) registered groundwater bores were found within 500m of the site based on a search of the WaterNSW groundwater bore data map (realtimedata.watercomau/water.stm). These bores were installed in 2004 and located within or in the vicinity of the existing Concrush facility. The bores are referred to as test bores, however no further information is provided on work summaries. Refer Appendix C. It is noted that there is a possibility for unregistered bores to be used in the wider area.	
Depth to groundwater	Approximately between 3.0 metres below ground level (mbgl) and 5.0mbgl (Ref [4])	
Estimated Groundwater flow direction	Unknown, although presumed to be towards the east based on site topography and information provided in Coffey 2013 (Ref [4])	
Background water quality	Unknown	

4 PRELIMINARY CONCEPTUAL SITE MODEL

Based on RCA's understanding of the site, the potential contamination sources, exposure pathways, and receptors are considered as follows:

Contaminant Sources:

- Historical filling of the site imported fills from unknown areas.
 - Contaminants of concern are considered to be metals, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH), benzene, toluene, ethyl benzene, xylenes (BTEX), metals and asbestos.
 - This may have resulted in contaminated soil and contaminated groundwater due to leaching through the contaminated fill.
- Historical filling of the site demolition waste.
 - Contaminants of concern are considered to be metals, TRH, PAH, BTEX, metals and asbestos.
 - This may have resulted in contaminated fill materials.
- Site activities including scrap metal salvage and processing and earthmoving machinery storage works:
 - Metals may be present in shallow site soils or have leached into deeper soil profiles/groundwater due to previous site activities.
 - Oils/lubricants may have leaked/spilled into shallow soils/deeper soils and groundwater.



- Oils/lubricants, petroleum hydrocarbons and battery acids from automotive repairs may have leaked/spilled into shallow soils/deeper soils and groundwater.
- Contaminants of concern are considered to be metals (including lead from historic fuels), TRH and BTEX.
- Use of hazardous (including asbestos) materials at the site:
 - Use of asbestos containing building materials and/or other hazardous materials on site.
 - Contaminants of concern are asbestos, lead, synthetic mineral fibres.
 - May have resulted in surface/shallow contamination of exposed soils from damaged or deteriorating materials.
- Acid Sulfate Soils
 - Historic and/or future developments in the area may cause disturbance of potential or actual acidic soils generating acidic conditions in shallow soils/deeper soils and groundwater.

Pathways:

- Health risk pathways are considered to be ingestion, inhalation or dermal contact of exposed soils and/or ingestion or dermal contact with groundwater.
- Ecological risk pathways are considered to be via potential offsite migration of contaminants via dust, surface water or groundwater.
- Potential subsurface pathways are dependent on delineation of contaminants, subsurface strata types and thickness, subsurface preferential pathways, depth to groundwater table and/or aquifer characteristics.

Receptors:

- Health risk receptors are considered to be site maintenance/construction workers, offsite groundwater uses.
- Ecological risk receptors are considered to be Cockle Creek and vegetated areas near to the site.

This assessment is specific to the site boundary for the Concrush expansion project. It does not assess risk caused by contamination within the remainder of the lot, that being the southern part of Lot 2 in DP 220347.

5 SAMPLING AND ANALYTICAL QUALITY PLAN

No formal sampling and analytical quality plan (SAQP) was developed for the assessment. The following sections detail the basis for the scope of work and were compiled to address the SEARs (Ref [2]).



5.1 STEP 1 – STATE THE PROBLEM

Based on the preliminary conceptual site model, it was considered that there was potential for hydrocarbon, metals and asbestos contamination arising from uncontrolled filling and previous site use as a metal salvage and processing yard. If present, contamination may pose constraints to proposed works and future use of the site may require specific management.

5.2 STEP 2 – IDENTIFY THE GOALS AND DECISIONS

The key uncertainty that the investigation has attempted to address was:

 Whether potential contaminants were present and if so did the concentrations of contaminants (asbestos, hydrocarbons and metals) exceed acceptable levels to preclude the site from being used for commercial/industrial uses under the current land zone?

In order to resolve this uncertainty, decisions were to be made about the presence and significance of potential contamination to facilitate the design of management measures to reduce risk. The specific decisions made were to investigate:

- Present potential contamination sources.
- The nature of contamination.
- The geology and hydrogeology.
- The potential and actual contaminant migration routes.
- Whether contaminants exceed acceptable levels.
- Whether further investigation or management is required.

5.3 STEP 3 – IDENTIFY INPUTS TO THE DECISIONS

The specific types of information needed to resolve the decision statements in Step 2 were noted as follows:

- Adequate conceptual site model.
- Soil material type.
- Appropriate field methods.
- Appropriate laboratory analysis methods.
- Analytical data for the collected samples.
- Appropriate assessment criteria for the media being investigated and the approved use of the land.

The National Environment Protection (Assessment of Site Contamination Measure (ASC NEPM) (Ref [6]) document has been approved by the NSW EPA for use on potentially contaminated sites and supersedes most of the preceding reference documents. The criteria from the ASC NEPM (Ref [6]) were considered appropriate for the determination of the significance of any contamination found.



SEPP 55 (Ref [1]) prescribes assessment on the basis of the most sensitive allowable site use. The site was not being actively used and the proposed use is to comprise a construction and demolition waste recycling facility. RCA therefore considered the criteria as defined for commercial and industrial land use to be appropriate for assessment of human health risk from the soil at the site under the current land zone as IN1 – General Industrial. The criteria for ecological risk were also those defined for commercial and industrial land use.

Full details of the relevant guidelines are included in **Appendix D**.

5.4 STEP 4 – DEFINE THE BOUNDARIES OF THE INVESTIGATION

The horizontal extent of the assessment has been defined by the marked area shown on the site plan (**Drawing 1**, **Appendix A**).

The investigation is bounded by:

- North the existing Concrush site.
- South proposed site boundary of Concrush extension.
- East Racecourse Road.
- West Main Northern Rail line corridor.

The vertical extent has been determined by consideration of the conceptual site model and the objectives of the assessment and has been determined to be:

- Four (4) metres below ground level for soil assessment.
- Two (2) metres below the depth of unconfined aquifer during drilling for groundwater monitoring wells.

Practical constraints that could interfere with sampling were access to areas of site.



5.5 STEP 5 – DEVELOP THE DECISION RULES

The Data Quality Indicators (DQI) that were to be implemented for the assessment are detailed in **Table 4**.

 Table 4
 Data Quality Indicators Implemented for the Assessment

DQI	Determined by	Criteria		
Accuracy	Internal – surrogates, laboratory control samples (LCS), matrix spikes, method blanks. External – trip spikes, field blanks and equipment washes.	Surrogate, LCS, spike - recovery data to be 70 to 130%. Blanks and equipment washes – results to be < Practical Quantitation Limit (PQL).		
Precision	Internal – laboratory duplicates. External – intralaboratory duplicates.	Relative Percentage Difference (RPD) of duplicates: • <50% RPD at concentration levels greater than ten times the PQL. • <75% RPD at concentrations between five to ten times the PQL. • <100% RPD at concentration levels between two and five times the PQL. Where concentration levels are less than two times the PQL, the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if the AD <2.5 times the PQL.		
Completeness	The percentage of completed data points, taking in account consideration of other DQI.	95%		
Representativeness	relevant analysis to determine that the	npling by appropriate methodology with assessment is representative of the site itions.		
Comparability	 All samples collected during this sampling programme to have been obtained by adequately trained RCA personnel using consistent sampling methodologies throughout the project. All samples must have been received by the laboratory cool and appropriately preserved for the requested analysis with sufficient time within the specified holding time. All laboratory analyses to have been conducted by NATA accredited methodologies that comply with the international standard methods referred to in the ASC NEPM (Ref [6]). Comparable analytes such as benzene, toluene, ethylbenzene, xylene (BTEX), total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH), phenols and metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) should show some concurrence between analytical results and to identified field observations. 			



5.6 STEP 6 – ACCEPTABLE LIMITS ON DECISION ERRORS

If the data received was not in accordance with the defined acceptable limits outlined in Step 5, it was to have been considered to be an estimate or rejected. Determination of whether this data could be used or, if re-sampling was required, was based on the following considerations:

- Closeness of the result to the guideline concentrations.
- Data analysis and the acceptance of 95% upper confidence limit (UCL) as the true mean value of the data set, and understanding that a conclusive statement made on these grounds has a 5% chance of being inaccurate.
- Specific contaminant of concern (eg, response to carcinogens may be more conservative).
- The area of site in question and the potential lateral and vertical extent of questionable information.
- Whether the uncertainty can be effectively managed by site management controls.

If any of the data validation procedures or criteria identified were not followed or met, this would have constituted a non-conformance. The significance of any non-conformance would have determined if rectification was required.

5.7 STEP 7 – OPTIMISATION OF THE DESIGN OF THE COLLECTION OF DATA

The site will be developed for an extension to the Concrush recycling facility.

The derived scope of work comprised collection of:

- Soil samples from thirteen (13) soil sampling locations up to 4.0m deep based on a judgemental sampling pattern to provide characterisation of potential contamination within soils throughout the site.
- Groundwater samples from two (2) newly installed groundwater monitoring wells at locations that were chosen based on available site history information regarding potential contaminants of concern (PCoC), closeness to the site boundary and the site inspection.

Disturbed soil samples were to have been collected directly from the solid flight auger (at two (2) locations) and the centre of an excavator bucket within fill and natural material (at 11 locations). These collection methods were chosen to aid in visually identifying material types and potential contamination within test pits and to enable soil sampling during installation of groundwater monitoring wells.

Samples were to have been screened using a photoionisation detector (PID) in the field to aid in the selection of samples for laboratory analysis.

Decontamination of soil sampling equipment was to have been undertaken by brushing of excess soil from the auger between locations. New, disposable nitrile gloves were to be employed at each sampling location.

Samples were to have been laboratory analysed for BTEX, TRH (C_6 - C_{40}), PAH, phenols, cyanide, metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), asbestos and acid sulfate soils.



Samples were to have been stored in the field in a chilled container on ice and sent to the laboratory within 24 hours of sampling under Chain of Custody (COC) documentation.

ALS was to have been used as the primary analysing laboratory for all analyses as well as quality assurance samples due to its NATA accreditation and experience with potentially contaminated soil and water.

A summary of the sampling strategy is presented in **Table 5**.



Table 5Sampling Strategy

Contaminating activity	Potential Contaminants of Concern (PCoC)	Sampling Strategy	Rationale for Sampling Strategy and Sampling Locations
Potential leakage, contaminated fill	BTEX, TRH, PAH, phenols, cyanide, metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), asbestos and acid sulfate soils	Collection of soil samples at below surface, 0.5, 1.0, 2.0, 3.0 and 4.0m below the surface. Additional samples were to have been collected based on PID, field observations of contamination or to characterise strata. A drill rig and excavator were to be utilised to obtain disturbed samples. Collection of groundwater samples at two (2) newly installed monitoring wells. Low flow sampling methods were utilised to obtain groundwater samples.	Thirteen (13) were chosen to provide characterisation of potential contamination within the soils at the site. A judgmental sampling pattern was to have been employed based on available site history information including a previous investigation on the site. Two (2) monitoring wells were chosen to provide characterisation of potential contamination within groundwater at the site. Locations were chosen based on available site history information regarding PCoC, closeness to the site boundary and site inspection.



6 FIELDWORK

RCA undertook a site inspection on 18 June 2018 and recorded the following observations in **Table 6**.

 Table 6
 General Site Conditions and Observations

Topography	The western portion of the site is generally flat. Standing surface water is more likely within the western portion of the site. The eastern portion of the site gently slopes to the east and Cockle Creek. The majority of stormwater runoff drains to the west naturally or via a central collection drain. A relatively smaller section at the eastern end of the site catchment drains to the local stormwater system along Racecourse Road (Ref [7]).			
Site condition	The site is currently vacant, with long grass and scattered shrubs and trees throughout. A cleared gravelled area is located in the north western portion of the site. An unpaved road runs along the site's northern boundary. There were a number of fill and other anthropogenic waste mounds including concrete, brick, timber and metal throughout the site. The majority of these mounds were running along the southern portion of site.			
Visual signs of potential impacts	Nil observed beyond the waste/fill mounds.			
Signs of erosion	Nil observed.			
Presence of drums or waste	Concrete slabs, metal pieces and machinery (i.e. bulldozers, excavators), brick fragments, were observed throughout the surface of the site.			
Identification of potential asbestos bearing materials	Nil observed proximal to sampling locations and areas with little vegetation cover, although RCA did not undertake a hazardous materials audit.			
Visible signs of plant stress	Nil observed.			
Odours noticeable on site	Nil observed.			
Evidence of current or former petroleum facilities	Nil observed.			
Chemicals stored on site	Nil observed.			
Evidence of waste burial: (anecdotal or otherwise)	Concrete slabs, metal pieces, brick pieces and other anthropogenic material observed at depth during test pitting. Refer Appendix E.			

An environmental scientist experienced in the handling of potentially contaminated soil undertook the fieldwork on 18 June 2018. The scope of work included:

- A site inspection.
- · Location of services.
- The collection of forty three (43) soil samples from thirteen (13) locations on the site:



- Soil samples were collected by excavator at eleven (11) locations throughout the site, with specific targeting of soil stockpile mounds on the southern portion of the site, and by track mounted drill rig utilising solid flight augers at two (2) locations situated on the southern boundary of the western half of the site.
- Samples were collected from fill and natural materials from between depths of approximately 0.1 and 4.0 metres below the existing ground surface.
- All samples were screened with a photoionisation detector (PID) for the presence of volatile compounds and to assist in the sample selection process.
- Sampling depths were determined in the field based on material types encountered and evidence of visual and olfactory contamination.
- Installation of two (2) groundwater monitoring wells.
- Re-instatement of all excavations.
- Photographing general site features and sample material collected. Refer to Photographs 1 to 4, Appendix E
- Logging of boreholes and test pits including description of samples for texture, colour, odour, moisture content. Logs are attached in **Appendix F**.
- Submission of twenty two (22) samples covering a range of soil types and depths for laboratory analysis of TRH, BTEX, PAH, phenols, cyanide, metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury), asbestos and acid sulfate soils.

No gross contamination issues were identified on the site during fieldwork. Stockpiles of concrete and metal were scattered throughout the site, with concrete, metal and other anthropogenic materials observed within the test pits also. Potential asbestos containing material (ACM) fragments were observed in several of the test pits (refer to section 8), although no ACMs were observed on the ground surface around sampling locations or within stockpiles during the current investigation. PID readings of all samples report did not report any detection of vapours.

The groundwater during sampling was observed to be dark grey and turbid at both BH1 and BH2, there was no visual or olfactory signs of contamination.

Fill was identified during fieldwork up to 4.0mbgl. Natural soils consisted of sandy clays.

The assessment was in accordance with the methodology outlined in Section 5.

7 QUALITY ASSURANCE/QUALITY CONTROL

RCA has assessed the quality assurance and quality control in **Appendix G** and found it to be acceptable for the purpose of site assessment.



8 RESULTS

A summary of results compared to the relevant criteria² is provided in **Appendix H**. The results from the previous Coffey investigation (Ref [4]) are provided in **Appendix B**. Full results are provided within the laboratory report certificates provided as **Appendix G**.

8.1 Soil

In summary, TRH, BTEX, PAH, phenols, cyanide and metals concentrations were either not detected or were detected at low concentrations below the relevant human health commercial/industrial land use criteria.

Similarly the results were below the relevant ecological commercial/industrial criteria with the exception of the following:

- Sample BH2/a which reported benzo(a)pyrene at 11.6mg/kg which is in excess of the ASC NEPM (Ref [6]) ecological screening level (1.4mg/kg).
- Samples BH1/a (664mg/kg), TP7/a (552mg/kg), TP8/a (526mg/kg), TP9/a (1,610mg/kg), TP9/b (4,150mg/kg) and TP12/b (925mg/kg) which reported zinc in excess of the calculated ASC NEPM (Ref [6]) ecological investigation level (360mg/kg).

Asbestos was not detected in any soil samples analysed. Chrysotile asbestos was detected within bonded ACM fragments collected from 0.5m depth at TP7, TP8 and TP9. The bonded material was in good condition at the time of sampling, with no visible fibres.

8.2 GROUNDWATER

In summary, TRH, BTEX, PAH, phenols, metals concentrations were either not detected or were detected at low concentrations below the relevant criteria with the exception of sample BH1 and BH2 which reported arsenic at 0.006mg/L and 0.005mg/L respectively in excess of the ecological criterion of 0.0013mg/L.

8.3 ACID SULFATE SOILS

Samples were collected from locations where natural soils were exposed near or below the groundwater table, where ASS is considered more likely to occur. Moderate reactions were observed during screening results as shown in **Table 7** below.

 Table 7
 Texture-based Acid Sulfate Action Criteria

Borehole	Depth (m)	Soil Type	Assessed Soil Texture	pH₅	pH _{FOX}	pH _F – pH _{FOX}	Reaction Rate
TP4	3.3-3.4	Sandy CLAY	Medium	7.4	3.5	3.9	Moderate
TP5	3.0-3.1	Sandy CLAY	Medium	5.9	2.6	3.3	Moderate
TP12	2.0-2.1	Sandy CLAY	Medium	5.8	2.9	2.9	Moderate
TP13	3.0-3.1	Sandy CLAY	Medium	4.8	2.0	2.8	Moderate

² As identified in **Section 5.3** and **Appendix D**





The field pH (pH $_{\rm F}$) of all samples tested was greater than pH4. When pyrite material is below the water table (i.e. saturated) and has not been oxidised, it is termed potential acid sulfate soil (PASS) and generally has a pH of >4.0, as such, the soils would not be classified as actual acid sulfate soils.

The pH after oxidation using 30% hydrogen peroxide (pH_{FOX}) of all soil samples resulted in pH readings of less than pH4 and there was a significant drop in pH from field value and, as such, net acid generating ability is considered likely.

The natural soils throughout the site would be considered to be PASS and if exposed they are likely to generate acid leachate causing a potential environmental degradation risk.

9 SITE CONTAMINATION CHARACTERISATION

The collection of soil samples from thirteen (13) locations is in accordance with the ASC NEPM (Ref [6]). Taking into consideration the seventeen (17) previous sampling locations undertaken by Coffey (Ref [4]), RCA considers the sampling density to be in accordance with NSW EPA guidelines (Ref [8]). As such RCA considers that there are sufficient samples to adequately characterise the soil materials in the site for the purpose of this baseline assessment

The ecological guidelines apply to soil within two (2) metres of the surface, as the root zone and habitation zone of many species. The exceedance of the ecological criteria for both zinc and B(a)P were in the top 1.0 m and has no bearing on risk to human health. The site was previously and is proposed to continue as a commercial/industrial property, and with little to no excavation works proposed apart from minor landscaping, to remove previously stockpiled soil, concrete and other anthropogenic material. RCA considers the exceedance of the ecological criteria for B(a)P and zinc in soil not to be significant for the proposed land use. There does not seem to be a correlation between these exceedances and the minor levels recorded below the relevant criteria in the groundwater and therefore are again not considered to be significant for the proposed industrial land use.

The samples in which the bonded fragments of asbestos containing material were identified in TP7, TP8 and TP9 did not indicate the presence of asbestos fibres within the soils collected from the same depth. This indicates that the asbestos within the bonded fragments is stable and not releasing fibres. On the understanding that there would be a clean fill layer placed on top of the site, and no major excavation works are proposed as part of the Concrush expansion onto the site; exposure to bonded ACM fragments would be very limited and RCA considers that the random presence of fragments of bonded asbestos in subsurface layers would not present a significant risk to human health. RCA recommends that that a construction management plan, along with a marker layer placed across the entire site in accordance with the environmental site management plan (ESMP) prepared by Coffey (Ref [5).

Acid sulfate soil samples TP4/3.3, TP5/3.0, TP12/2.0 and TP13/3.0 readings indicated that potential acid sulfate soils are present within the site. According to Wallsend acid sulfate soils risk map there is a high probability of acid sulfate soil materials. The proposed development is understood to involve minor excavation works in the form of drainage and sediment basins of less than one (1) metre in depth. Thus, the potential acid sulfate soils present are not considered of concern as they will remain buried. Should any excavation or earthworks be required into natural soils to depths near the groundwater table, a management plan for acid sulfate soils will be required.



RCA does not consider there to be a risk to human health during the proposed development works. However, it is recommended that protocols regarding disturbance of soils and personal hygiene are reviewed/generated to ensure that there is sufficient information about the potential risk and required management measures to reduce risk to human health for personnel working on the site during development works. Further detail is provided in **Section 10**.

The remainder of Lot 2 DP220347 to the south which is currently regulated under the CLM Act does not appear to have impacted the site. The proposed expansion by Concrush should not be affected by the southern portion of Lot 2 DP220347 and past contaminating activities following the completion of construction.

10 MITIGATION AND MANAGEMENT MEASURES

Due to the presence of asbestos and acid sulfate soils at the site, RCA recommends that a management plan, with reference to SafeWork NSW, be prepared for the construction phase of the development. Mitigation and management measures related to contamination should be documented in a works specific management plan and include but not limited to:

- Induction of all personnel to advise of potential hazards and the management measures that are required to control risk.
- Dust minimisation. This may be affected by minimisation of the area of disturbance, application of water/chemical to surfaces, minimisation of vehicles at the site prior to the application of the capping layer, control of vehicle speed.
- Surface water management including bunding to divert surface water from areas of disturbance and stockpiled areas. Provision of sediment traps downgradient of areas of disturbance and stockpiled areas.
- ASS management as presented in an acid sulfate management plan if deemed necessary due to the depth of excavations.
 - The plan would likely include placing excavated soil on compacted clay pad or a
 geosynthetic liner and treatment by application of lime. Validation of treatment
 would be required prior to the material being re-used on site or disposed of.
 Reburial without treatment may be possible depending on the extent of time
 excavated material will be stockpiled.
- Use of personal protective equipment (PPE) that restricts dermal contact with soil and prevents inhalation/ingestion of dust and inhalation of asbestos fibres (if considered a risk based on the works).

11 CONCLUSIONS

This report presents the findings of a baseline contamination assessment undertaken on vacant land adjacent to the Concrush facility on Racecourse Road, Teralba NSW.



The assessment consisted of a site inspection and onsite sampling and analysis of twenty two (22) samples from thirteen (13) locations and the collection of groundwater from two (2) locations on the site for analysis of potential contaminants of concern (TRH, BTEX, PAH, phenols, cyanide, metals and asbestos). Fragments of potential asbestos material were identified at three (3) locations and samples were submitted for laboratory testing.

No soil or groundwater contamination was found in excess of the commercial/industrial human health criteria relevant for the current or future site use. Asbestos was confirmed to be present within the identified fragments, however asbestos fibres were not identified within the soils proximal to the fragments or in any other soil samples.

Six (6) soil samples, BH1/a, TP7/a, TP8/a, TP9/a, TP9/b and TP12/b had zinc concentrations in excess of the EIL criterion, while one (1) soil sample, BH2/a, had a B(a)P concentration in excess of the ESL criterion. However, RCA considers the detection of zinc and B(a)P to be a negligible risk to the ecological receptors due to the proposed industrial use of the site, lack of a significant ecological population requiring protection on site and the distance to the nearest offsite receptors. RCA considers based on the current investigation and previous Coffey investigation (Ref [4]), which also reported concentrations of metals, TRH and PAH below the relevant criteria; that the baseline conditions at the site are commensurate with the land zone as IN1 – General Industrial, and the site would be suitable for the proposed industrial development provided the following are completed:

- Characterisation of stockpiles of fill, concrete and metal to determine suitability for onsite reuse or classification for offsite waste removal (or otherwise) prior to the proposed expansion.
- The placement of a high visibility marker layer between the existing site surface and any imported material or pavement across the entire site, in line with the ESMP (Ref [5]) and taking into account SafeWork NSW requirements in relation to asbestos management.
- The compilation, and implementation of a management plan during any form of excavation works to address potential risks associated with contamination.
- Preparation and implementation of an acid sulfate soil management plan for any excavation into natural soils to depths near the groundwater table.

12 LIMITATIONS

This report has been prepared for Concrush Pty Ltd in accordance with an agreement with RCA. The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the sole use of Concrush Pty Ltd. The report may not contain sufficient information for purposes of other uses or for parties other than Concrush Pty Ltd. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.



Environmental conditions including contaminant concentrations can change in a limited period of time. This should be considered if the report is used following a significant period of time after the date of issue.

Yours faithfully RCA AUSTRALIA

Rom

Richie Lamont Environmental Scientist Porsooker

Fiona Brooker Associate Environmental Engineer

REFERENCES

- [1] Department of Urban Affairs and Planning, State Environmental Planning Policy (SEPP 55): Remediation of Land, August 1998.
- [2] Planning and Environment NSW, State Significant Development Secretary's Environmental Assessment Requirements (SEARs), Concrush increase to throughput capacity (SSD 8753), 21 Racecourse Road, Teralba (Lot 2, DP 220347, December 2017.
- [3] Lake Macquarie City Council Local Environmental Plan 2014, under the Environmental Planning and Assessment Act 1979, published 2014
- [4] Coffey Environments Australia Pty Ltd, Soil Contamination Assessment Proposed Industrial Subdivision, Racecourse Road, Teralba NSW, 1 May 2013
- [5] Coffey Environments Australia Pty Ltd, Environmental Site Management Plan, Proposed Industrial Subdivision, Racecourse Road, Teralba NSW, 9 July 2014
- [6] NEPC, National Environment Protection (Assessment of Site Contamination) Measure, 1999 as amended 2013.
- [7] Umwelt, Concrush Increase to Capacity Project, Soil and Water Impact Assessment, 2018
- [8] NSWEPA, Sampling Design Guidelines, September 1995.
- [9] CRC Care, Technical Report 10, Health screening levels for petroleum in soil and groundwater, September 2011.
- [10] ANZECC, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, October 2000.
- [11] National Health and Medical Research Council, *Australian Drinking Water Guidelines*, 2011
- [12] National Health and Medical Research Council, *Guidelines for Managing Risks in Recreational Water*, 2008
- [13] DECC, Contaminated Sites Guidelines for the Assessment and Management of Contaminated Groundwater, March 2007.



- [14] NSW Acid Sulfate Soil Management Advisory Committee (ASSMAC), *Acid Sulfate Soil Manual*, August 1998
- [15] Standards Australia, Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds, AS 4482.1-2005.

GLOSSARY

ASC NEPM National Environment Protection (Assessment of Site

Contamination) Measure.

EIL Ecological investigation level. Relates to soil concentrations which

may pose a risk to ecological health.

ESL Ecological screening level. Relates to vapour risk from petroleum

hydrocarbons which may pose a risk to ecological health.

HIL Health investigation level. Relates to soil concentrations which

may pose a risk to human health in soil.

HSL Health screening level. Relates to the vapour risk from petroleum

hydrocarbons which may pose a risk to human health in soil.

In-Situ In place, without excavation.

Intralaboratory A sample split into two and sent blind to the sample laboratory for

comparative analysis.

ISL Investigation screening levels for soil. Comprised of HIL/EIL and

HSL/ESL

kg kilogram, 1000 gram.

LEP Local environment plan. A planning tool for the Local Government.

mg milligram, 1/1000 gram.

NEPC National Environment Protection Council.

NSW EPA NSW Environment Protection Authority – formerly a component of

DECC, DECCW, OEH but made a separate entity in 2011 to

regulates the contaminated land industry.

PID Photoionisation detector. Measures volatile gases in air or

emanating from soil or water.

PPE Personal Protective Equipment.

PQL Practical Quantitation Limit.

QA Quality Assurance.

QC Quality Control.

RPD Relative Percentage Difference.

UCL Upper Confidence Level



Appendix A

Drawings



GEOTECHNICAL • ENVIRONMENTAL

CLIENT Concrush Pty Ltd

FB

DRAWN BY

APPROVED BY

RCA Ref

OFFICE

1:1000 (A3) DRAWING No

7/11/2018

13589-401/3

NEWCASTLE

REV 1

CDT-DWG-A3H-001/1

Approximate borehole location

Approximate test pit location



GEOTECHNICAL • ENVIRONMENTAL

CLIENT Concrush Pty Ltd

FB

DRAWN BY

APPROVED BY

RCA Ref

OFFICE

1:3000 (A3) DRAWING No

7/11/2018

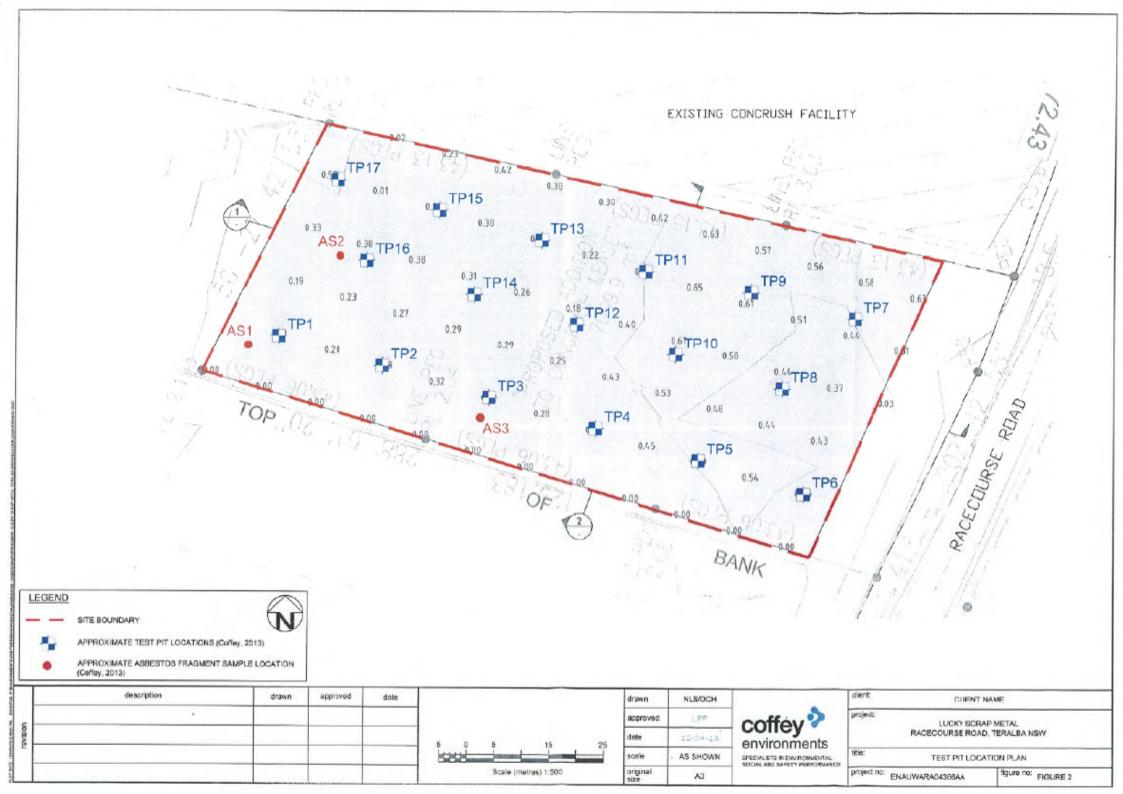
13589-401/3

2 REV 1

NEWCASTLE

Approximate area of previous investigation

Approximate location of notified area



Appendix B

Summary of Coffey Results

Table LR1 - Summary of Soil Laboratory Results All results in mg/kg

Sample ID	INVESTIGATION	LABORATORY	TP1	TP2	TP3	TP4	TP5	TP6	TP7 .	TP8	TP9	TP10	TP11	TP12	TP13	I TP14	TP15	TP16	TP17	AS-1	AS-2	I AS-3
epth (m)	CRITERIA	DETECTION	0.0-0.1	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5	0.9-1.0	0.4-0.5	0.9-1.0	0.4-0.5	0.4-0.5	0.2-0.3	0.9-1.0	0.4-0.5	0.4-0.5	0,4-0.5	0.9-1.0	0.4-0.5	Surface	Surface	Surfac
ate of Sampling	CHITERIA	LIMIT	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	27/03/2013	28/03/2013						
letals																		100				-
rsenic	500 5	2	6.9	2.9	8.2	9.0	11.0	17.0	3.0	8.3	8.1	6.8	5.0	6.6	11.0	18.0	7.2	2.2	23.0			-
admium	100 1	0.4	0.4	<0.4	<0.4	0.5	0.4	<0.4	<0.4	0.5	0.5	0.5	<0.4	<0.4	1.3	0.4	0.5	<0.4	0.7	-		
hromium	500 1	5.0	<5	<5	<5	<5	5.1	<5	<5	<5	<5	5.3	<5	<5	6.7	5.1	<5	<5	10.0		-	-
Copper	5000	5.0	33.0	13.0	7.0	43.0	15.0	51.0	<5	34.0	19.0	35.0	14.0	22.0	53.0	30.0	27.0	10.0	150.0	-	-	-
ead	1500 1	5	89.0	37.0	35.0	130.0	44.0	72.0	7.4	89.0	46.0	85.0	36.0	170.0	130.0	75.0	77.0	34.0	260.0			
Mercury	75 1	0.05	<0.05	< 0.05	<0.05	0.06	< 0.05	0.07	<0.05	0.12	0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	0.07		-	-
lickel	3000 '	5.0	<5	<5	<5	<5	<5	5.2	<5	<5	5.0	<5	<5	<5	5.9	<5	<5	<5	6.5			1
inc	35000 1	5.0	430.0	160.0	170.0	910.0	180.0	710.0	12.0	390.0	170.0	590.0	85.0	220.0	430.0	360.0	310.0	140.0	1400.0	-		. ,
otal Petroleum Hydrocarbo	ns										_								_			
C6 - C9 Fraction	65 2	20	<20		<20	<20	<20		<20		<20		<20	<20		<20		-			74	
010 - C14 Fraction		20	<20	1 62	<20	<20	<20		<20	1	<20		<20	24.0		<20		1			-	1
C15 - C28 Fraction		50	<50		<50	<50	<50		<50		<50		<50	80.0		<50		-				1
29 - C36 Fraction		50	<50		<50	<50	<50		<50		<50		<50	90.0		<50			-			
Total C10-C36	1000 2	50	<50		<50	<50	<50		<50		<50		<50	194.0		<50				- 5		
BTEX																			-			-
Benzene	1.2	0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1		<0.1	<0.1	74.1	<0.1	-		-		- 2	
oluene	130 2	0.1	<0.1	(<0.1	<0.1	<0.1		<0.1		<0.1	2.	<0.1	<0.1		<0.1				-		
thylbenzene	50 2	0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1		<0.1	<0.1		<0.1	-	-	-		-	1
otal Xylene	25 3	0.3	<0.3		<0.3	<0.3	<0.3		<0.3	-	<0.3		<0.3	<0.3		<0.3		- 2				
olynuclear Aromatic Hydro	carbons				1															-		
enzo(a)pyrene	5 1	0.50	<0.5	<0.5	<0.5	<0.5	1.30	<0.5	<0.5	<0.5	0.60	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	4.5			
otal PAHs	100 1	1,00	<1	<1	<1	1.20	16.00	2.40	<1	<1	7.20	<1 <1	<1	<1	<u.5< td=""><td><1</td><td><1.5</td><td><0.5</td><td><0.5</td><td>- :</td><td>-</td><td>-</td></u.5<>	<1	<1.5	<0.5	<0.5	- :	-	-
rganochlorine Pesticides																						
ldrin & Dieldrin	50 1	0.05	1 2	<0.05	<0.05	(4)	-		-	<0.05		7	_		0.05				_			
hiordane	250 1	0.05		<0.05	<0.05										<0.05		,	<0.05				
OT + DDE + DDD	1000 1	0.05		<0.05	<0.05 <0.05		- :			<0.05	-	- :	-:-		<0.05	-		<0.05				
leptachlor	50 1	0.05		<0.05	<0.05	(4)				<0.05			-		< 0.05	- :	- :	<0.05 <0.05	- :		- 1	
olychlorinated Biphenyls																						
otal PCB	50 1	0.5	<0.5		<0.5			<0.5				20					<0.5					
henois																						
ital Phenolics	42500	0.1		<0.1			<0.1	0.50					<0.1				<0.1	(F)				
bestos				Land To Control																		
sbestos in Soil/ACM	Not Detected 3	detect	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Dotostod	Not Datastad	Not Detected	Not Detected	Not Detected	Not Detected	Datacted	Detected	Detecte

Notes:

Concentration exceeds adopted criticals

Not Analysed

Not Analysed

Not Ec (2006) Guidelines for the NSW Site Auditor Scheme (2nd Edition) - Appendix III, Column 4 (commercial or industrial)

Reaced on NSW EPA (1994) Guidelines for Aspessing Service Station Sites

3 Based on Enhealth (2005) Guidelines for the Management of Asbestos in the Non-occupational Environment

Concentration exceeds adopted critieria

Concentration exceeds approximately to the NSW Site Auditor Scheme (2nd Edition) - Appendix II, Column 4 (commercial or industrial) Based on NSW EPA (1994) Quidelines for Assessing Service Station Sites Based on NSW EPA (1994) Quidelines for Assessing Service Station Sites Based on Enhealth (2005) Quidelines for the Management of Astessos in the Non-occupational Environment

Appendix C

Groundwater Bore Search



NSW Office of Water Work Summary

GW200158

Licence: 20BL169523 Licence Status: ACTIVE

Authorised Purpose TEST BORE

(s):

Intended Purpose(s): TEST BORE

Work Type: Bore Work Status: Construct.Method: **Owner Type:**

Commenced Date: Final Depth: Completion Date: 10/12/2004 **Drilled Depth:**

Contractor Name:

Driller:

Assistant Driller:

Property: N/A 21 RACECOURSE ROAD

Standing Water Level:

TERALBA 2284

GWMA: -Salinity: GW Zone: -Yield:

Site Details

Site Chosen By:

County **Parish** Cadastre Form A: NORTH NORTH.59 2 220347 Licensed: NORTHUMBERLAND Whole Lot **TERALBA** 2//220347

Region: 20 - Hunter CMA Map:

River Basin: - Unknown **Grid Zone:** Scale:

Area/District:

Northing: 6353961.0 Easting: 370941.0 Latitude: 32°56'42.1"S Longitude: 151°37'09.7"E Elevation: 0.00 m (A.H.D.) **Elevation** Unknown

Source:

GS Map: -MGA Zone: 0 Coordinate Map Interpretation

Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack: PC-Pressure Cemented: S-Sump: CF-Centralisers

<u> </u>	of Graver rack, i of recodure Gernerica, o Gamp, GE Gernarioero									
H	lole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
					(m)	(m)	Diameter	Diameter		
							(mm)	(mm)		

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Hole	Duration	Salinity
(m)	(m)	(m)		(m)	(m)	(L/s)	Depth	(hr)	(mg/L)
1							l(m)		

Geol	ogis	ts Log		
Drille	ers L	.og		
	<u> </u>			

Fro	m To	Thickness	Drillers Description	Geological Material	Comments	
(m)	(m)	(m)			l I	

10/12/2004: Form A Remarks: No Form A received Bore location map received Bore A of 7 bores (A - G)

*** End of GW200158 ***

NSW Office of Water Work Summary

GW200159

Licence: 20BL169523 Licence Status: ACTIVE

Authorised Purpose TEST BORE

Intended Purpose(s):

Work Type: Bore
Work Status:
Construct.Method:

Owner Type:

Commenced Date: Final Depth: Completion Date: 12/12/2004 Drilled Depth:

Contractor Name:

Driller:

Assistant Driller:

Property: N/A 21 RACECOURSE ROAD

Standing Water Level:

TERALBA 2284

GWMA: - Salinity: GW Zone: - Yield:

Site Details

Site Chosen By:

CountyParishCadastreForm A:NORTHNORTH.592 220347Licensed:NORTHUMBERLANDTERALBAWhole Lot2//220347

CMA Map:

Region: 20 - Hunter CMA Map:
River Basin: - Unknown Grid Zone:

Area/District:

Scale:

 Elevation:
 0.00 m (A.H.D.)
 Northing:
 6353979.0
 Latitude:
 32°56'41.5"S

 Elevation:
 Unknown
 Easting:
 370946.0
 Longitude:
 151°37'09.9"E

GS Map: - MGA Zone: 0 Coordinate Map Interpretation

Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack: PC-Pressure Cemented; S-Sump; CF-Centralisers

<u> </u>	of Graver rack, i of recodure Gernerica, o Gamp, GE Gernarioero									
H	lole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
					(m)	(m)	Diameter	Diameter		
							(mm)	(mm)		

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Hole	Duration	Salinity
(m)	(m)	(m)		(m)	(m)	(L/s)	Depth	(hr)	(mg/L)
							l(m)		

(Geol	ogis	ts Log		
I	Drille	ers L	.og		
ı					

From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)	-		

12/12/2004: Form A Remarks: No Form A received Bore location map received Bore B of 7 bores (A - G)

*** End of GW200159 ***

NSW Office of Water Work Summary

GW200160

Licence: 20BL169523 Licence Status: ACTIVE

Authorised Purpose TEST BORE

Intended Purpose(s):

Work Type: Bore Work Status: Construct.Method:

Owner Type:

Commenced Date: Final Depth: Completion Date: 10/12/2004 **Drilled Depth:**

Contractor Name:

Driller:

Assistant Driller:

Property: N/A 21 RACECOURSE ROAD

Standing Water Level:

TERALBA 2284

GWMA: -Salinity: GW Zone: -Yield:

Site Details

Site Chosen By:

County **Parish** Cadastre Form A: NORTH NORTH.59 2 220347 Licensed: NORTHUMBERLAND Whole Lot **TERALBA**

2//220347

Region: 20 - Hunter CMA Map:

River Basin: - Unknown **Grid Zone:** Scale:

Area/District:

Northing: 6353964.0 Easting: 370960.0 Elevation: 0.00 m (A.H.D.) Latitude: 32°56'42.0"S Longitude: 151°37'10.4"E **Elevation** Unknown

Source:

GS Map: -MGA Zone: 0 Coordinate Map Interpretation

Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack: PC-Pressure Cemented: S-Sump: CF-Centralisers

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F	lole	Pipe	Component	Туре	From	То	Outside	Inside	Interval Details
Т					(m)	(m)	Diameter	Diameter	·
							(mm)	(mm)	

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Hole	Duration	Salinity
(m)	(m)	(m)		(m)	(m)	(L/s)	Depth	(hr)	(mg/L)
							l(m)		

Geol	ogis	ts Log		
Drille	ers L	.og		
	1			

From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)	-		

10/12/2004: Form A Remarks: No Form A received Bore location map recieved Bore C of 7 bores (A - G)

*** End of GW200160 ***

NSW Office of Water Work Summary

GW200161

Licence: 20BL169523 Licence Status: ACTIVE

Authorised Purpose TEST BORE

Intended Purpose(s):

Work Type: Bore Work Status: Construct.Method: **Owner Type:**

Commenced Date: Completion Date: 10/12/2004

Final Depth: **Drilled Depth:**

Contractor Name:

Driller:

Assistant Driller:

Property: N/A 21 RACECOURSE ROAD

Standing Water Level:

TERALBA 2284

GWMA: -GW Zone: -

Salinity: Yield:

Site Details

Site Chosen By:

County Form A: NORTH Licensed: NORTHUMBERLAND

Parish Cadastre NORTH.59 2 220347 Whole Lot **TERALBA**

2//220347

Region: 20 - Hunter CMA Map:

River Basin: - Unknown **Grid Zone:** Scale:

Area/District:

Elevation: 0.00 m (A.H.D.) **Elevation** Unknown

Northing: 6353941.0 Easting: 370978.0

Latitude: 32°56'42.8"S Longitude: 151°37'11.1"E

Source:

GS Map: -MGA Zone: 0 Coordinate Map Interpretation

Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack: PC-Pressure Cemented: S-Sump: CF-Centralisers

or Orav	of Graver a dok, i G i resource Germented, G Gamp, GE Germansers									
Hole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details	
		-		(m)	(m)	Diameter	Diameter			
						(mm)	(mm)			

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Hole	Duration	Salinity			
(m)	(m)	(m)		(m)	(m)	(L/s)	Depth	(hr)	(mg/L)			
1				1	I	l .	/m\					

Geol	logi	sts	Log
Drille	ers	Loc	1

From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)	-		

10/12/2004: Form A Remarks: No Form A received Bore location map only received Bore D of 7 bores (A - G)

*** End of GW200161 ***

NSW Office of Water Work Summary

GW200162

Licence: 20BL169523 Licence Status: ACTIVE

Authorised Purpose TEST BORE

Intended Purpose(s):

Work Type: Bore Work Status: Construct.Method: **Owner Type:**

Commenced Date: Final Depth: Completion Date: 10/12/2004 **Drilled Depth:**

Contractor Name:

Driller: **Assistant Driller:**

Property: N/A 21 RACECOURSE ROAD

Standing Water Level:

TERALBA 2284

GWMA: -Salinity: GW Zone: -Yield:

Site Details

Site Chosen By:

County **Parish** Cadastre Form A: NORTH NORTH.59 2 220347 Licensed: NORTHUMBERLAND Whole Lot **TERALBA** 2//220347

Region: 20 - Hunter CMA Map:

River Basin: - Unknown **Grid Zone:** Scale:

Area/District:

Northing: 6353939.0 Easting: 370980.0 Elevation: 0.00 m (A.H.D.) Latitude: 32°56'42.9"S Longitude: 151°37'11.2"E **Elevation** Unknown

Source:

GS Map: -MGA Zone: 0 Coordinate Map Interpretation

Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack: PC-Pressure Cemented: S-Sump: CF-Centralisers

<u> </u>	of Graver Fack, For resource Germentea, Godinp, GE Germanisers									
H	lole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
					(m)	(m)	Diameter	Diameter		
							(mm)	(mm)		

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Hole	Duration	Salinity
(m)	(m)	(m)		(m)	(m)	(L/s)	Depth	(hr)	(mg/L)
							(m)		

(Geol	ogis	ts Log			
[Drille	ers L	og			
П			1			

Fro	m To	Thickness	Drillers Description	Geological Material	Comments	
(m)	(m)	(m)			l I	

10/12/2004: Form A Remarks: No Form A received Bore location map received Bore E of 7 bores (A - G)

*** End of GW200162 ***

NSW Office of Water Work Summary

GW200163

Licence: 20BL169523 Licence Status: ACTIVE

Authorised Purpose TEST BORE

Intended Purpose(s):

Work Type: Bore Work Status: Construct.Method: **Owner Type:**

Commenced Date: Final Depth: Completion Date: 10/12/2004 **Drilled Depth:**

Contractor Name:

Driller: **Assistant Driller:**

Property: N/A 21 RACECOURSE ROAD

Standing Water Level:

TERALBA 2284

GWMA: -Salinity: GW Zone: -Yield:

Site Details

Site Chosen By:

County **Parish** Cadastre Form A: NORTH NORTH.59 2 220347 Licensed: NORTHUMBERLAND Whole Lot **TERALBA** 2//220347

Region: 20 - Hunter CMA Map:

River Basin: - Unknown **Grid Zone:** Scale:

Area/District:

Northing: 6353939.0 Easting: 370960.0 Elevation: 0.00 m (A.H.D.) Latitude: 32°56'42.8"S Longitude: 151°37'10.4"E **Elevation** Unknown

Source:

GS Map: -MGA Zone: 0 Coordinate Map Interpretation

Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack: PC-Pressure Cemented: S-Sump: CF-Centralisers

or Oras	or rac	nt, i o i icoouic	ocinicintou, o c	Juliip, Oi		unocio			
Hole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
				(m)	(m)	Diameter	Diameter		
				<u> </u>	ľ ,	(mm)	(mm)		

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Hole	Duration	Salinity
(m)	(m)	(m)		(m)	(m)	(L/s)	Depth	(hr)	(mg/L)
							l(m)		

(Geol	ogis	ts Log		
I	Drille	ers L	.og		
ı					

From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)	-		

10/12/2004: Form A Remarks: No Form A received Bore location map received Bore F of 7 bores (A - G)

*** End of GW200163 ***

NSW Office of Water Work Summary

GW200164

Licence: 20BL169523 Licence Status: ACTIVE

Authorised Purpose TEST BORE

Intended Purpose(s):

Work Type: Bore Work Status: Construct.Method:

Owner Type:

Commenced Date: Final Depth: Completion Date: 10/12/2004 **Drilled Depth:**

Contractor Name:

Driller:

Assistant Driller:

Property: N/A 21 RACECOURSE ROAD

Standing Water Level:

TERALBA 2284

GWMA: -Salinity: GW Zone: -Yield:

Site Details

Site Chosen By:

County **Parish** Cadastre Form A: NORTH NORTH.59 2 220347 Licensed: NORTHUMBERLAND Whole Lot **TERALBA** 2//220347

CMA Map:

Region: 20 - Hunter River Basin: - Unknown **Grid Zone:**

Area/District:

Elevation: 0.00 m (A.H.D.)

Elevation Unknown Source:

Northing: 6353936.0 Easting: 371010.0 Latitude: 32°56'43.0"S Longitude: 151°37'12.3"E

GS Map: -MGA Zone: 0 Coordinate Map Interpretation

Source:

Scale:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack: PC-Pressure Cemented: S-Sump: CF-Centralisers

<u> </u>	of Graver Fack, For resource Cernemea, Godinp, GE Cernamoers													
H	lole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details				
					(m)	(m)	Diameter	Diameter						
							(mm)	(mm)						

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Hole	Duration	Salinity
(m)	(m)	(m)		(m)	(m)	(L/s)	Depth	(hr)	(mg/L)
							(m)		

Geol	ogis	ts Log		
Drille	ers L	.og		
	<u> </u>			

Fro	m To	Thickness	Drillers Description	Geological Material	Comments	
(m)	(m)	(m)			l I	

10/12/2004: Form A Remarks: No Form A received Bore location map received Bore G of 7 bores (A - G)

*** End of GW200164 ***

Appendix D

Screening Levels and Guidelines

NATIONAL ENVIRONMENT PROTECTION (ASSESSMENT OF SITE CONTAMINATION) MEASURE 1999 AS AMENDED 2013

Soil

The investigation and screening levels (ISL) utilised for the assessment of the soil on site were sourced from the NEPM for the Assessment of Site Contamination (Ref [6]). These ISL are not derived as acceptance criteria for contamination at a site, but as levels above which specific consideration of risk, based on the site use and potential exposure, is required. If a risk is determined as present, then remediation and/or management must be undertaken.

Assessment ISL are based on:

Human Health -

Intentionally conservative health investigation levels (HIL) have been derived for four (4) generic land use settings.

- HIL 'A' Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry). This category includes children's daycare centres, preschools and primary schools.
- HIL 'B' Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high rise buildings and flats.
- HIL 'C' Public open space such as parks, playgrounds, playing fields (eg, ovals) secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves).
- HIL 'D' Commercial/industrial such as shops, offices, factories and industrial sites

The exposure scenario for the derivation of the relevant land use setting is set out in the table later in this **Appendix**.

Health screening levels (HSL) have been determined for risks associated from vapour intrusion from petroleum³ compound contamination for the same land use settings. These HSL are additionally based on the fraction of compound, the soil texture and the depth of the encountered soil.

Direct hydrocarbon contact criteria are not provided in the ASC NEPM (Ref [6]), however these are provided in CRC Care Technical Report 10 (Ref [9]) which is the source document for the HSL.

Ecological Health -

These levels are considered to apply to soil within two (2) metres of the surface, the root zone and habitation zone of many species.

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 $^{^3}$ Laboratory analysis of hydrocarbons is being reported as total recoverable hydrocarbons (TRH). This testing method includes all forms of hydrocarbons, not just petroleum hydrocarbons and therefore can be considered a conservative measure against the chosen TPH criteria. Further laboratory analysis using a silica gel clean up (TRH_{sq}) is considered to enable a better identification of the extent of petroleum based contamination.

Ecological investigation levels (EIL) have been determined for arsenic, copper, chromium III, DDT, naphthalene, nickel, lead and zinc in soil based on species sensitivity model and for three (3) generic land use settings:

- Areas of ecological significance for areas where the primary intention is for the conservation and protection of the natural environment. Protection level of 99%.
- Urban residential areas and public open space broadly equivalent to the HIL 'A', HIL B and HIL C land use settings. Protection level of 80%.
- Commercial and industrial land uses considered to be broadly equivalent to HIL 'D' land use setting. Protection level of 60%.

Methodology for the derivation of EIL for other contaminants is available in the ASC NEPM (Ref [6]) and requires additional soil character data.

Ecological screening levels (ESL) have been determined for petroleum compound contamination. Due to limitations in the data only moderate reliability ESL have been determined for fractions <C₁₆, applied generically in fine and coarse grained soils. ESL for petroleum fractions > C₁₆, BTEX and naphthalene are consider low reliability.

Aesthetics -

Aesthetic considerations operate separately to the HIL/HSL and EIL/ESL assessment. Issues to be considered include:

- Highly malodorous soils or extracted groundwater (eg, strong residual petroleum hydrocarbon odours, hydrogen sulphide in soil or extracted groundwater, organosulfur compounds).
- Hydrocarbon sheen on surface water.
- Discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature.
- Large monolithic deposits of otherwise low-risk material, eg, gypsum as powder or plasterboard, cement kiln dust.
- Presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep-fill profile of green waste or large quantities of timber waste.
- Soils containing residue from animal burial (eg, former abattoir sites).

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

Tier 1 assessment comprises the comparison of the soil data with the HIL/HSL and EIL/ESL. In the event that some concentrations are in excess of the relevant criteria, the summary statistics of the data set may be utilised for assessment purpose. Consideration of a range of statistics is recommended; at a minimum the 95%UCL_{ave} should be compared to the relevant criteria as long as:

No single value exceeds 250% of the relevant criterion.



 The standard deviation of the results for each analyte is less than 50% of the relevant criterion.

In addition to appropriate consideration and application of the HSL and ESL, there are a number of policy considerations which reflect the nature and properties of petroleum hydrocarbons:

- Formation of observable light non-aqueous phase liquids (LNAPL).
- Fire and explosive hazards.
- Effects on buried infrastructure, eg, penetration of, or damage to, in-ground services by hydrocarbons.

The ASC NEPM (Ref [6]) has therefore provided management limits, the application of which will require consideration of site-specific factors such as the depth of building basements and services and depth to groundwater, to determine the maximum depth to which the limits should apply. The management limits may have less relevance at operating industrial sites (including mine sites) which have no or limited sensitive receptors in the area of potential impact. When the management limits are exceeded, further site-specific assessment and management may enable any identified risk to be addressed.

The presence of site hydrocarbon contamination at the levels of the management limits does not imply that there is no need for administrative notification or controls in accordance with jurisdiction requirements.



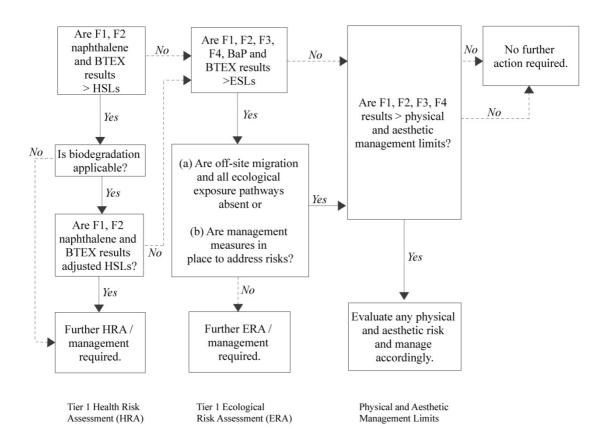


Figure 1 Flowchart for the Tier 1 human and ecological risk assessment of petroleum hydrocarbon contamination – application of HSL and ESL and consideration of management limits

Water

Schedule B6 of the ASC NEPM (Ref [6]) provides generic groundwater investigation levels (GIL) which are defined as 'the concentration of a contaminant in groundwater above which further investigation is required'. Selected GIL are tabulated in Table 1C of Schedule B1 and are sourced from the:

- Australian water quality guidelines for fresh and marine water (AWQG, Ref [10])).
- Australian drinking water guidelines (ADWG, Ref [11]).
- Guidelines for managing risk in recreational water (GMRRW, Ref [12]).

The GIL are designed to avoid unacceptable impact to exposed populations or ecosystems under a range of circumstances. The aquatic ecosystem protection GIL presented in Table 1C of Schedule B1 are applicable to 'slightly - moderately disturbed' ecosystems. The AWQG (Ref [10]) should be consulted, or additional values for protection of disturbed ecosystems and pristine ecosystems.

Schedule B1 of the ASC NEPM (Ref [6]) provides generic health screening levels (HSL) for groundwater, for protection of human health from petroleum hydrocarbon vapours.



DECC 2007, Guidelines for the Assessment and Management of Groundwater Contamination

These groundwater quality guidelines have been introduced by the NSW DECC (Ref [13]) and recommend that AWQG (Ref [10]) investigation levels be adopted as groundwater investigation levels (GIL) for aquatic ecosystems and ADWG (Ref [11]) for drinking water GIL.

The AWQG (Ref [10]) are complex guidelines that consider not only the level of protection (eg, 99% or 95%) but also the state of the receiving water (eg, moderately disturbed). For the protection of aquatic ecosystems the DECC recommend the use of 95% protection for all analytes with the exception of carcinogenic analytes for which the 99% protection value should be used. The following comments are additionally made:

- Where the existing generic GIL is below the naturally occurring background concentration of a particular contaminant, the background concentration becomes the default GIL.
- Where PQL are greater than the recommended GIL the PQL is adopted as the GIL.
 Where background concentrations are proven to be greater than the GIL, the background concentration is adopted as the GIL.
- Where there is insufficient data for the derivation of marine water criteria it is allowable to use fresh water criteria (Section 8.3.4.5, pg 8.3-36, (Ref [10])).

The ADWG (Ref [11]) document provides a framework for drinking water quality management and assessment. The framework provided in this document has been adopted for the evaluation of contaminants in groundwater where groundwater can be, or is being, extracted and used for drinking water purpose.

RCA notes that the ASC NEPM (Ref [6]) endorses the guidelines for use as GIL.

BACKGROUND OF ASS TESTING AND ASSESSMENT CRITERIA

Estuarine sediments of coastal NSW from the Holocene geological age contain iron pyrite, the main constituent of acid sulfate soils. The Holocene sediment is found below and up to 5m Australian Height Datum (AHD) typically in coastal and floodplain areas. The sediment can be divided into classes based on its oxidised state. If the pyritic material above the water table is being oxidised and has a pH <4.0 it is called actual acid sulfate soil (AASS). If the pyrite material is below the water table and has not been oxidised, it is termed potential acid sulphide soil (PASS) and generally has a pH of >4.0. The pH has the potential to become much lower when the soil is exposed to oxygen. Sediment, which, after the addition of hydrogen peroxide, has a pH <3.5 strongly indicates the presence of ASS.

The ASSMAC Guidelines (Ref [14]) outline Action Criteria based on Acid Sulfate Soil analysis. These are based on three (3) broad texture categories, and can be seen below in **Table 8**.



 Table 8
 Texture-based Acid Sulfate Action Criteria

Type of Mater	ial	Tonnes of	ia if 1 to 1000 material is ırbed	Action Criteria > 1000 Tonnes of material is Disturbed			
Soil Texture	Approx. Clay Content (%)	Equivalent Sulphur (%S)	Equivalent Acidity (mol H+/tonne)	Equivalent Sulphur (%S)	Equivalent Acidity (mol H+/tonne)		
Coarse (silty sand to sands)	≤5	0.03	18	0.03	18		
Medium (sandy loam-light clay)	5-40	0.06	36	0.03	18		
Fine (Medium to heavy clays and silty clays)	≥40	0.1	62	0.03	18		

APPROPRIATENESS OF THE GUIDELINES

The ASC NEPM (Ref [6]) document has been approved by the NSWEPA for use on potentially contaminated sites and supersedes most of the preceding reference documents.

Best practise in alignment with council's requirements prescribes assessment on the basis of the most sensitive allowable site use. Currently the site is vacant and is proposed to be developed into a concrete, asphalt, brick, pavers, tiles, rock, sand, plasterboard and green waste processing facility. RCA therefore considers the criteria as defined for the commercial/industrial to be appropriate for assessment of human health risk from the soil at the site. The ecological risk has been assessed under the criteria defined for areas of commercial/industrial. Results have also been compared to the criteria as defined for the commercial and industrial land use for human health risk from the soil at the site for completeness.

The ASC NEPM (Ref [6]) are both endorsed guidelines and are applicable for groundwater.

RCA has determined that the receiving water is the Cockle Creek, and although the creek may be brackish water, the most conservative criteria has been chosen, and as such the AWQG (Ref [10]) 95% fresh water criteria have been used for the assessment of risk to aquatic ecosystems.

It is not considered that groundwater concentrations would be representative of direct contact in the Cockle Creek Estuary and may not be representative of extracted groundwater off the site.

RCA has compared the results to the drinking water guidelines (Ref [11]) for completeness, however due to the supply of reticulated water to the site these criteria are not considered relevant for the relevant site.



Appendix E

Site Photographs



PHOTOGRAPH 1 Anthropogenic materials (concrete, brick etc.) from within TP5



PHOTOGRAPH 2 Anthropogenic materials (concrete, tyre etc.) from withinTP6

Client: Concrush RCA Australia

Project: Contamination Assessment

Location: Racecourse Rd, Teralba **RCA ref:** 13589-401/3



PHOTOGRAPH 3 Fill, anthropogenic material and groundwater seepage in TP8



PHOTOGRAPH 4 Natural soils from above and below groundwater level excavated from TP13

Client: Concrush RCA Australia

Project: Contamination Assessment

Location: Racecourse Rd, Teralba **RCA ref:** 13589-401/3

Appendix F

Bore and Test Pit Logs



ENVIRONMENTAL BOREHOLE LOG

SHEET 1 OF 1

PROJECT No: 13589 CLIENT: Concrush Pty Ltd

PROJECT: Contamination Assessment

DATE COMMENCED: 18/06/2018 DATE COMPLETED: 18/06/2018

SURFACE RL: COORDS:

DRILL MODEL: Geoprobe 6712

DRILLER NAME:

L	LOCATION: Racecourse Road, Teralba DRILLER NAME:														
		Borehole Infor	mation			Field Material Information									
METHOD	WATER	FIELD	SAMPLE	DEРТН (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	DRE CONSTRUCTION					
			BH1a QA2 0.10m	-		LL, Sandy CLAY, brown, with some sandstone and neous gravel	-0	D			- - Backfill - -				
				-0.5 - -							 				
			1.00m BH1b 1.10m	1.0 			-0				_ - - - Gravel _				
le.				- 1.5 - <i>1.60</i> -	N	ATURAL, Sandy CLAY, grey		W			-				
al, Developed by Datg			2.00m BH1c 2.10m	- - 2.0 -	s	aturated at 2.0m	-0	S			- - - -				
RCA_LIB_08.1_RCA_STANDARD.GLB Log RCA NON CORED LOG 13589-LOGS.GPJ < <drawingfile>> 20/07/2018 12:40 Produced by gINT Professional, Developed by Datget</drawingfile>				- - - 2.5 - -							- - - -				
awingFile>> 20/07/2018 12:4				- -3.0 - -							- Screen -				
13589-LOGS.GPJ < <dra< td=""><td></td><td></td><td></td><td>- -3.5 - -</td><td></td><td></td><td></td><td></td><td></td><td></td><td>- - - -</td></dra<>				- -3.5 - -							- - - -				
g RCA NON CORED LOG				- -4.0 - -							- - - - -				
RCA_STANDARD.GLB Log				- 4.50; - - -	В	OREHOLE BH1 TERMINATED AT 4.50 m					- - - -				
RCA_LIB_08.1	LOGGED: RJL					CHECKED: FB	1	DAT	E: 20/0)7/2018					



ENVIRONMENTAL BOREHOLE LOG

SHEET 1 OF 2

PROJECT No: 13589 CLIENT: Concrush Pty Ltd

PROJECT: Contamination Assessment LOCATION: Racecourse Road, Teralba

DATE COMMENCED: 18/06/2018 DATE COMPLETED: 18/06/2018

SURFACE RL: COORDS:

DRILL MODEL: Geoprobe 6712

DRILLER NAME:

L	LO		ON: Raceco		au, re	aiba	DRILLER NAME:						
ŀ		Bo	rehole Infor	mation	_		Field Material Info	ormatic	n (P	k 1			
	METHOD	WATER	FIELD	SAMPLE	DEPTH (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	ВС	RE CONSTRUCTION	
.08.1_RCA_STANDARD.GLB Log RCA NON CORED LOG 13589-LOGS.GPJ <-DrawingFile>> 20/07/2018 12:40 Produced by gINT Professional, Developed by Datgel				3.00m BH2a QA1 0.10m 1.00m BH2b 1.10m			FILL, Clayey SAND, brown, with some igneous gravel FILL, Sandy CLAY, dark brown, with some igneous gravel and trace of coal and timber NATURAL, Sandy CLAY, grey Saturated at 2.5m	-0		S		+ Backfill + Gravel - Screen	
RCA_LIB_08.1_R0	L	OGGI	ED: RJL				CHECKED: FB		DA	TE: 20/07	7/2018		



PROJECT No: 13589

CLIENT: Concrush Pty Ltd

PROJECT: Contamination Assessment

ENVIRONMENTAL BOREHOLE LOG

SHEET 2 OF 2

DATE COMMENCED: 18/06/2018
DATE COMPLETED: 18/06/2018

SURFACE RL: COORDS:

DRILL MODEL: Geoprobe 6712

DRILLER NAME:

	LO	CAT	ION: Raceco	urse Ro	ad, Te	ralba	DRILLER NAME:									
		В	orehole Infor	mation			Field Material Information									
	METHOD	WATER	FIELD	SAMPLE	DEРТН (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	BORE CONSTRUCTION					
RCA_LIB_08.1_RCA_STANDARD.GLB Log RCA NON CORED LOG 13589-LOGS.GPJ < <drawingfile>> 20/07/2018 12:40 Produced by gINT Professional, Developed by Datgel</drawingfile>	METI	WAT	FIE TE	SAM		01 0 C C C C C C C C C C C C C C C C C C	shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents) NATURAL, Sandy CLAY, grey BOREHOLE BH2 TERMINATED AT 6.00 m) QIA	ω MOIST	CONSIST RELA RELA RELA DENG DENG DENG STATE DE STREIA STRE	BORE CONSTRUCTION					
08.1_RCA_STANDARD.GLB					9.5 - - -											
RCA_LIB	L	.OGG	GED: RJL				CHECKED: FB		DAT	ΓE: 20/0	07/2018					



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road, Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

				ad, Ter	aıva	Field Material Information								
	Test Pit Inf	ormation	n l			Field Material Information								
WATER	FIELD	SAMPLE	DEPTH (m)	GRAPHIC LOG	sha	DESCRIPTIC COIL NAME; plasticity/grain size, ape, secondary components, min CK NAME; grain size, colour, min	colour, particle or constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS			
			- 0.10 -			dy CLAY, pale brown			D		FILL			
		0.50m TP3a 0.60m	-0.5		FILL, Clay pieces and	ey SAND, brown, with metal, bric I timber	k, concrete, sandstone	-0			- - - -			
		1.00m TP3b 1.10m	- - 1.0 -					-0.2	M		- - - -			
5.00		2.00m	- 1.5 - -								- - - -			
18/06/18		2.00m TP3c 2.10m	-2.0 - - - -2.5					-0	W		- - - -			
1806/18			- - - -3.0								- - - -			
			-3.20 - - -3.5		TEST PIT Test pit co	TP3 TERMINATED AT 3.20 m Illapse					- - -			
			- -4.0								- - - -			
			-4.5 -								- - - -			
LOGGED: RJL						CHECKED: FB			DA	ΓE: 20/0	07/2018			



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road. Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

LOC	CATION:	Racecou	rse Ro	oad, Ter	alba	EXCAVATION METHOD: Excavator							
1	Test Pit Ir	formatio	n			Field Material	Informa	tion					
WATER	FIELD	SAMPLE	DEPTH (m)	GRAPHIC LOG	(S sh: (RC	DESCRIPTION SOIL NAME; plasticity/grain size, colour, particle lape, secondary components, minor constituents) DCK NAME; grain size, colour, minor constituents	·)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS		
\$		0.50m TP4a 0.60m 1.10m 1.10m 2.00m 1.10m	- 0.5 - 1.0 - 1.5 - 1.70	15	FILL, Sandigneous gr	dy CLAY, brown, with metal, brick, concrete and		0.2	NO D D D D D D D D D D D D D D D D D D D	CONG RE DE DE STI	FILL		
8		3.30m \$3.48m	-2.5 -3.0 -3.10 -		Sandy CL	AY, pale grey			W		NATURAL		
18/06/18		3.40111	-3.5 -3.60-		TEST PIT	TP4 TERMINATED AT 3.60 m							
			-4.0										
LC	LOGGED: RJL					CHECKED: FB			DA	ΓE: 20/0	07/2018		



SHEET 1 OF 1

PROJECT No: 13589 CLIENT: Concrush Pty Ltd PROJECT: Contamination Assessment LOCATION: Racecourse Road, Teralba DATE: 18/06/2018 SURFACE RL: COORDS:

Test Pit Information Field Material Information											
WATER	FIELD	SAMPLE	DEРТН (m)	GRAPHIC LOG	sha	DESCRIPTION SOIL NAME; plasticity/grain size, colour, particle ape, secondary components, minor constituents) DCK NAME; grain size, colour, minor constituents)			MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
		0.10m TP5a 0.20m	- 0.20 -			vey SAND, brown, with rootlets and some gravel	-0.2		D M		FILL - -
		0.50m TP5b 0.60m	- - 0.5 -				-0				- - - -
			- - - 1.0 -								- - - -
18/06/181			- - 1.5 -						W		- - - -
Daveloped by Datger		2.00m TP5c 2.10m	- - 2.0 - - 2.20 -				-0.3	3			
And in the second of the second control of the second of t			- - - 2.5 -		Sandy CL	AY, grey mottled pale brown					NATURAL -
		3.00m ASS 3.10m	- - 3.0 -								- - - -
			- - -3.5 -								- - - -
			3.80 - 4.0 	7.4.7	TEST PIT	TP5 TERMINATED AT 3.80 m					
D-1			- - -4.5 -								- - - -
	DGGED: F	<u> </u>	-			CHECKED: FB			D 4.7	TE: 20/0	



SHEET 1 OF 1

PROJECT No: 13589 CLIENT: Concrush Pty Ltd PROJECT: Contamination Assessment LOCATION: Racecourse Road, Teralba DATE: 18/06/2018 SURFACE RL: COORDS:

Test Pit Information				Field Material Information									
WATER	FIELD	SAMPLE	DEРТН (m)	GRAPHIC LOG	sha	OIL NAME; plas ape, secondary CK NAME; grai	components, n	e, colour, parti ninor constitue	nts)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
		0.50m TP6a 0.60m	- - 0.20 - - - - 0.5 -			dy CLAY, brown			concrete	-0	D		FILL
		1.00m TP6b 1.10m	- - 0.90 – 1.0 - -		FILL, Sand brick and p	dy CLAY, brown plastic	and pale brow	n, with concre	te, metal,	-0.3			- - - - -
		2.00m	- - 1.5 - - - - - 2.0										- - - - -
1800618		2.00m TP6c 2.10m	- 2.0 - - - - 2.5 -							-0	М		- - - - -
▽			- 3.0 										- - - - - -
18/06/181			- - - - 4.00-		TEST PIT	TP6 TERMINAT	ED AT 4.00 m				W		- - - -
			- - -4.5 - -										- - - - - -
LOGGED: RJL				CHECKED: FB					DA	DATE: 20/07/2018			



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road, Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

LOCATION: Racecourse Road,								
Test Pit Information	Field Material Information							
WATER FIELD TEST SAMPLE DEPTH (m) GRAPHIC	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	MEATHERING ON SISTURE ON SISTURE ON SISTURE ON SISTEMBLY ON SISTEMBLY ON SISTURE OF SIST						
0.50m	FILL, Clayey SAND, brown, with some concrete, brick, plastic pipe, trace of metal Suspected ACM fragment at 0.5m -0.3 Tile fragment at 1.0m -0 TEST PIT TP7 TERMINATED AT 4.00 m	M FILL						
-4.5								
LOGGED: RJL	CHECKED: FB	DATE: 20/07/2018						



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road, Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

		ATION: Racecourse Road, Teralba EXCAVATION METHOD: Excavator est Pit Information Field Material Information									
	Test Pit In	ormation				Fleid	iviateriai informa	llion	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	
WATER	FIELD TEST	SAMPLE	ОЕРТН (m)	GRAPHIC LOG	sha (RC	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)					STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
			_		FILL, Clay	ey SAND, brown, with some rootlets and	d igneous gravel		D		FILL
			- - 0.30 -								
		0.50m TP8a 0.60m	- - 0.5		plastic	dy CLAY, brown, with concrete, brick, so					_
		0.60m	-		Suspected	I ACM fragment at 0.5m		0.3			
			-								
		1.00m TP8b 1.10m	1.0 -				-	0.1			_
			-								
			- 1.5		Cloth fragr	nent at 1.5m					_
			-								
		2.00m TP8c 2.10m	- 2.0								
		2.10m	-					-0	М		
			-								
			2.5 -								_
			-								
			- 3.0								- -
			-								
			- 3.5								-
			-								
18/06/18			-						W		
18//90/81			4.00 -	XXXX	TEST PIT	TP8 TERMINATED AT 4.00 m					
			-								
			-4.5								-
			-								
			-		-			1			
LO	OGGED: F	IJL				CHECKED: FB		DATE: 20/07/2018			



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road. Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

LOC	OCATION: Racecourse Road, Teralba EXCAVATION METHOD: Excavator										
	Test Pit Ir	nformatio	n				Field Material Info	ormation			
WATER	FIELD	SAMPLE	DEPTH (m)	GRAPHIC LOG	(S sh: (RC	DESCRI SOIL NAME; plasticity/grain ape, secondary components DCK NAME; grain size, colou	size colour particle	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
			-		FILL, Clay	vey SAND, brown, rootlets, s	ome igneous gravel		D		FILL
			- 0.20 - -		FILL, Sand gravel, son	dy CLAY, brown, with concre me plastic and tyres	ete, brick, metal, igneous				
		0.50m TP9a 0.60m	0.5					-0.5			
		1.00m TP9b 1.10m	1.0					-0.2	W	_	
			- - - 1.5								
∇		2.00m TP9c 2.10m	2.0					-0.1	W	-	
18/06/181			- - 2.5 -								
			-3.0 -								
			- -3.5 -								
_			4.00		TEST PIT	TP9 TERMINATED AT 4.00	m				
			- - -								
			-4.5 -								
10	OGGED:	RJI	-			CHECKED: FB			DA.	TE: 20/0	07/2018



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road. Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

	OCATION: Racecourse Road, Teralba EXCAVATION METHOD: Excavator										
	Test Pit Information Field Material Information										
WATER	FIELD TEST	SAMPLE	DEPTH (m)	GRAPHIC LOG	(S sha (RC	DESCRIPTIOI SOIL NAME; plasticity/grain size, c ape, secondary components, mino OCK NAME; grain size, colour, min	olour, particle	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
			- 0.20 -			rey SAND, brown, rootlets and igne			D		FILL
		0.50m	-		FILL, Sand plastic, igr	dy CLAY, brown, with timber, some neous and sandstone gravel and ty	e concrete, tile, re				
		0.50m TP10a 0.60m	0.5 					-0.2			
		1.00m TP10b 1.10m	1.0					-0.3			
Not Encountered			- - - 1.5								
		2.00m TP10c 2.10m	-2.0					-0.1	М	_	
			-2.5								
			-								
			-3.00-		TEST PIT Refusal or	TP10 TERMINATED AT 3.00 m n unknown object					
			-3.5								
			-4.0 -								
			- -4.5								
			- - -								
LC	OGGED: I	RJL	•	'		CHECKED: FB		•	DA ⁻	ΓE: 20/0	07/2018



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road. Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

		Racecourse Road, Teralba EXCAVATION METHOD: Excavator									
-	Test Pit Ir	formatio	n	ļ ,		F	ield Material Informa	ation			
WATER	FIELD	SAMPLE	DEPTH (m)	GRAPHIC LOG	sh	DESCRIPTIOI SOIL NAME; plasticity/grain size, c ape, secondary components, mino CK NAME; grain size, colour, min	olour, particle r constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
					FILL, Clay	ey SAND, brown, rootlets and igne	eous gravel		D		FILL
			- 0.20 - - -		FILL, Sand gravel, con	dy CLAY, brown mottled green, wit ncrete, brick, trace of cloth and me	h some igneous tal	-			
		0.50m TP11a 0.60m	-0.5					-0.3			
		1.00m TP11b 1.10m	1.0					-0.2			
			- - 1.5 -								
		2.00m TP11c 2.10m	2.0					-0	M	-	
			- - 2.5 -								
			- -3.0 -								
18/06/18			- -3.5 -						W	-	
			-4.00-		TEST DIT	TP11 TERMINATED AT 4.00 m					
			- - -		ILOI FII	THE TENNING TED AT 4.00 III					
			- -4.5 -								
	DGGED: I	211	-			CHECKED: FB			DA-	ΓE: 20/0	07/2018



SHEET 1 OF 1

PROJECT No: 13589 CLIENT: Concrush Pty Ltd PROJECT: Contamination Assessment LOCATION: Racecourse Road, Teralba DATE: 18/06/2018 SURFACE RL: COORDS:

_	Test Pit In			au, rer	aiba	Field N	Material Informa				
WATER	FIELD TEST	SAMPLE	DEРТН (m)	GRAPHIC LOG	sha	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)					STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
		0.50m TP12a 0.60m	- 0.20 - - - - 0.5		FILL, Sand	ey SAND, brown, with rootlets and igned by CLAY, brown and pale brown, with tre some metal	e stump, brick,	-0.3	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	FILL
		1.00m TP 12b QA3 (1.10m	- - - 1.0					-0			- - - - - -
Not Encountered		2.00m TP12c 2.10m	-1.5					-0	М		- - - - -
		<u>2.10m</u>	- - - 2.5 - - 2.70 -								- - - -
		3.00m ASS 3.10m	-3.0			AY, pale brown and grey TP12 TERMINATED AT 3.30 m			W		NATURAL -
			-3.5 - - - 4.0								- - - - -
LCC			- - - -4.5								- - - - - -
L	OGGED: F	RJL	_			CHECKED: FB			DAT	TE: 20/0	- - 7/2018



SHEET 1 OF 1

PROJECT No: 13589
CLIENT: Concrush Pty Ltd
PROJECT: Contamination Assessment
LOCATION: Racecourse Road. Teralba

DATE: 18/06/2018 SURFACE RL: COORDS:

LOCATION: Racecourse Road, Teralba EXCAVATION METHOD: Excavator									
	Test Pit In	nformatio	on T		Field Material Inf	ormation		L	
WATER	FIELD	SAMPLE	DEPTH (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY, RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AN ADDITIONAL OBSERVATIONS
			-		FILL, Clayey SAND, brown, with rootlets and igneous gravel		D		FILL
			- 0.20 -		FILL, Sandy Gravelly CLAY, with ironstone gravel				
		0.50m TP13a 0.60m	0.5						
		0:60m	0.60 -		FILL, Sandy CLAY, dark brown, with some igneous gravel	-0.1			
			-						
		1.00m TP13b 1.10m	1.0			-0.2	М		
			- - 1.5						
			1.60 -		Sandy CLAY, grey mottled pale brown				NATURAL
-		2.00m ASS-TP 2.10m	13c ^{2.0}			-0	W		
			-						
			-2.5						
			-						
			3.00	///	TEST PIT TP13 TERMINATED AT 3.00 m				
			-						
			-						
			-3.5						
			-						
			-4.0						
			-						
			-						
			-4.5 -						
			-						
			-						
L	OGGED:	RJL			CHECKED: FB		DA	TE: 20/0	07/2018



ENGINEERING FIELD SHEET

WATER SAMPLING RECORD

CLIENT:		Univelt	57.7	D	ATE:	27/6/18
PROJECT:		/ / / / /	sessmen	P	ROJECT No:	13569
LOCATION:	19 11		d, Teralba	С	LIENT REF:	
WATER MET	ER USED	: ENV-	10050			-
DATE & TYP	E OF LAS	T CALIBRATION (1PT	OR FULL):	27/6/18	full Calibration	in
METHOD OF	SAMPLIN	IG: LO	w Flow plus	nyo.		
PRESERVAT	ION & ST	ORAGE (TICK):	Field Temp	Chilled	d (<4°C)	Frozen
Un-preserve	d	Preserved: A	cid (H ₂ SO ₄)	Acid (HNO ₃)	Alkaline (NaOH)	Filtered
TESTS REQU	JIRED:	8	72			
OTHER DETA	AILS:					
BORE DEP	ルらと TH: AQUIFER	C. 48M (TOP	12:40 pm	ABOVE GROUND LE\ VOLUME PURGED:	/EL:	-w
Check No.	рН	Conductivity (mS/cm)	Turbidity	Dissolved O ₂ (mg/L)	Temperature (°C)	Salinity (%)
1/	6.65	187	401	iş .	20.4	0.08
2/	0.00	, ,				
3/				•		
4/		38	× 50			
6/				1,2		
Sample App			7-000-0 011-11	dearing in bottle	, no odour	
Duplicate/E	quipment	Wash Identification a	nd Other Kemai	ks: •		2
egr			4	KS:		У
BORE OR L	OCATION	IID: <u>B</u> H	4	ks: -		¥
BORE OR L	OCATION	IID: <u>BH</u>	11		/EL: 0.83	3 m
BORE OR L	OCATION	1 ID: BH M TO 5.10 m (10)	/1/	ABOVE GROUND LEV		3 M
BORE OR L TIME: BORE DEPT DEPTH TO	OCATION ///// TH: AQUIFER	11D: BH m TO 5.10m (10)	/1/	ABOVE GROUND LEV	/EL: 0.8:	3 M
BORE OR L TIME: BORE DEPT DEPTH TO RESULTS O	OCATION / // / IH: AQUIFER OF WATER	TID: BH TO 5.10m (10) 1.86 m R QUALITY CHECK:	(1 (10P) (10P)	ABOVE GROUND LEV		Salinity (%)
BORE OR L TIME: BORE DEPT DEPTH TO	OCATION / // / IH: AQUIFER OF WATEF	11D: BH m TO 5.10m (10)	(1) (10P) Turbidity	ABOVE GROUND LEV VOLUME PURGED:	_51_	
BORE OR L TIME: BORE DEPT DEPTH TO RESULTS O	OCATION / // / IH: AQUIFER OF WATER	TID: BH TO 5.10 m (10) 1.86 m R QUALITY CHECK: Conductivity (mS/cm)	(1 (10P) (10P)	ABOVE GROUND LEV VOLUME PURGED:	51 Temperature (°C)	Salinity (%)
BORE OR L TIME: BORE DEPTH TO A RESULTS C Check No.	OCATION / // / IH: AQUIFER OF WATEF	TID: BH TO 5.10 m (10) 1.86 m R QUALITY CHECK: Conductivity (mS/cm)	(1) (10P) Turbidity	ABOVE GROUND LE\ VOLUME PURGED: Dissolved O₂ (mg/L)	51 Temperature (°C)	Salinity (%)
BORE OR L TIME: BORE DEPT DEPTH TO A RESULTS O Check No.	OCATION / // / IH: AQUIFER OF WATEF	TID: BH TO 5.10 m (10) 1.86 m R QUALITY CHECK: Conductivity (mS/cm)	(1) (10P) Turbidity	ABOVE GROUND LE\ VOLUME PURGED: Dissolved O₂ (mg/L)	51 Temperature (°C)	Salinity (%)
BORE OR L TIME: BORE DEPT DEPTH TO RESULTS OF Check No.	OCATION / // / IH: AQUIFER OF WATEF	TID: BH TO 5.10 m (10) 1.86 m R QUALITY CHECK: Conductivity (mS/cm)	(1) (10P) Turbidity	ABOVE GROUND LE\ VOLUME PURGED: Dissolved O₂ (mg/L)	51 Temperature (°C)	Salinity (%)
BORE OR L TIME: BORE DEPT DEPTH TO A RESULTS OF Check No. 1/ 2/ 3/ 4/ 5/ 6/	OCATION / /// ITH: AQUIFER PH 731	TID: BH. TO 5.10m (TO) 1.86 m R QUALITY CHECK: Conductivity (mS/cm) 1.49	HEIGHT	ABOVE GROUND LEV VOLUME PURGED: Dissolved O ₂ (mg/L)	51 Temperature (°C)	Salinity (%)
BORE OR L TIME: BORE DEPT DEPTH TO A RESULTS OF Check No. 1/ 2/ 3/ 4/ 5/ 6/ Sample App	OCATION / /// ITH: AQUIFER PH 7-3/ Decarance:	TID: BH. TO 5.10m (TO) 1.86 m R QUALITY CHECK: Conductivity (mS/cm) 1.49	Turbidity A greg Ma	ABOVE GROUND LEV VOLUME PURGED: Dissolved O ₂ (mg/L)	51 Temperature (°C)	Salinity (%)
BORE OR L TIME: BORE DEPT DEPTH TO A RESULTS OF Check No. 1/ 2/ 3/ 4/ 5/ 6/ Sample App	OCATION //// ITH: AQUIFER PH 7.3/ Dearance: quipment	TID: BH. TO 5.10m (TO) 1.86 m R QUALITY CHECK: Conductivity (mS/cm) 1.49 Jurbid, dw. Wash Identification at	Turbidity A greg Ma	ABOVE GROUND LEV VOLUME PURGED: Dissolved O ₂ (mg/L)	51 Temperature (°C)	Salinity (%)

Appendix G

Quality Assurance Review and Laboratory Report Sheets

The collection of all soil samples was undertaken in compliance with the details provided in Section 7.

A total of three (3) intralaboratory duplicate soil samples were submitted blind to the laboratory for analysis. This represents a percentage of greater than 10%, in accordance with the frequency recommended by the Australian Standard AS 4482.1-2005 (Ref [15]) and RCA protocol.

No water duplicate was submitted because of the low number of samples collected.

No soil field blank was submitted as it was considered a low potential for cross-contamination during the sampling process.

One water field blank and one equipment wash were submitted. This submission is in accordance with the frequency recommended by the Australian Standard AS 4482.1-2005 (Ref [15]) and RCA protocol.

Two (2) trip blanks and two (2) trip spikes were submitted. This submission is in accordance with the frequency recommended by the Australian Standard AS 4482.1-2005 (Ref [15]) and RCA protocol.

Results, as shown further in this **Appendix**, indicate a total of three (3) analyses which report RPD in excess of the acceptance criteria:

- BH2a/QA1 reported elevated RPD for TRH >C₁₆-C₃₄ and PAH compounds. This sample is described as 'clayey sand fill' and it is therefore considered that sample heterogeneity is the likely cause of the high RPD. There is some uncertainty associated with this sample, and the duplicate sample reported the higher concentration in each instance and therefore the duplicate result has been used for the characterisation of the site.
- BH1a/QA2 reported elevated RPD for zinc. This sample is described as 'sandy clay fill' and it is therefore considered that the samples heterogeneity is the likely cause of the high RPD. There is some uncertainty associated with this sample, however, the sample recorded the higher concentration and therefore the uncertainty is considered to be conservative.
- TP12b/QA3 Reported elevated RPD for zinc and two (2) PAH compounds (fluoranthene and pyrene). This sample is described as 'sandy clay fill' and it is therefore considered that the sample heterogeneity is the likely cause of the high RPD. There is some uncertainty associated with this sample, and the duplicate sample reported the higher concentration in each instance and therefore the duplicate result has been used for the characterisation of the site.

The trip blank results were non-detectable in both the soil and water samples. The water trip spike results represented recoveries of between the 70% to 130% and the soil results represented less than 30% RPD from the control sample.

There were no detectable concentrations in the equipment wash.

Concentrations of TRH were detected in the field blank equal to the detection limit and concentrations of copper and zinc were identified. The water used tap water sourced prior to fieldworks taking place and it is likely that the concentrations are representative of those within the water.

ALS was chosen as the analysing laboratory and is NATA accredited and experienced in the analytical requirements for potentially contaminated soil and water.



ALS undertook internal quality assurance testing. Results are contained within the laboratory report sheets, included in this **Appendix F**. **Table 9** and **Table 10** present a summary of their review.

 Table 9
 Internal Quality Assurance Review - Soil

	Number Samples (including QA)	Laboratory Duplicates	Spikes	Laboratory Control Samples	Laboratory Blanks
Requiren	nent	10%	5%	One every batch	One every batch
Metals (As, Cd, Cr, Cu, Ni, Hg, Pb, Zn)	22	5	2	2	2
TRH C ₆ -C ₁₀	23	4	2	2	2
TRH C _{>10} -C ₄₀	2	4	2	2	2
BTEX	22	4	2	2	2
PAH	22	4	2	2	2
Phenois	22	4	2	2	2
Cyanide	22	4	2	4	2
Asbestos in soil	21	0	0	0	0
Asbestos	3	0	0	0	0

 Table 10
 Internal Quality Assurance Review - Water

	Number Samples (including QA)	Laboratory Duplicates	Spikes	Laboratory Control Samples	Laboratory Blanks
Requiren	Requirement			One every batch	One every batch
Metals (As, Cd, Cr, Cu, Ni, Hg, Pb, Zn)	6	2	1	1	1
TRH C ₆ -C ₁₀	6	2	1	1	1
TRH C _{>10} -C ₄₀	6	0	0	1	1
BTEX	6	2	1	1	1
PAH	6	0	0	1	1
Phenols	6	0	0	1	1

Examination of the above tables reveals that ALS has undertaken laboratory quality assurance testing in accordance with the ASC NEPM (Ref [6]), with the exception of laboratory duplicates and spikes for TRH $C_{>10}$ - C_{40} , PAH and phenols, which is due to the small number of samples.

- Recoveries of Surrogates were within acceptance criteria of 70 to 130%.
- Holding Times were within laboratory specified timeframes.
- Recoveries of laboratory control samples were within the acceptance criteria of 70 to 130%.



- Recoveries of Spikes were within acceptance criteria of 70 to 130%.
- Relative Percentage Differences for duplicates were within acceptance criteria as defined for intralaboratory duplicates further in this **Appendix**.
- No Laboratory Blank result was detected above the practical quantification limit (PQL).

It is therefore considered that the data obtained from this testing is accurate and reliable in as far as it can be ascertained.



Sample Identification Primary		BH1A QA2			BH2A QA1		TP12B QA3				TS	TSC		Trip Blank
Sample Depth (m)		0.	1		0	.1			1				Ī	TTIP DIATIK
Date	PQL	18/6	/18	Ī	18/	6/18		18/0	6/18		12/	6/18	Ī	14/6/18
	· ·			Ī									1	<u> </u>
		Sandy Clay fill, b	rown with como	RPD %	Clayou Sand	fill, brown with	RPD %	Sandy Clay f	ill, brown and	RPD %	Trin Cniko o	nd Trip Spike	RPD %	
Sample Profil	е	sandstone and				ous gravel		pale brown wi				ntol		Trip
			3 3			3		brick, concrete	e, some metal					Blank
Sample collected b	IV	RCA -	RJL	†	RCA	RCA - RJL		RCA	- RJL				†	Diank
Duplicate Typ		Intralab	oratory	İ	Intralat	oratory		Intralab	oratory		Intralat	oratory	İ	
Benzene, Toluene, Ethylbenzene,		_							,					
Benzene	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	<0.2
Toluene	0.5	0.25	0.25	0.0	0.25	0.25	0.0	0.25	0.25	0.0	6.5	8.6	27.8	<0.5
Ethylbenzene	0.5	0.25	0.25	0.0	0.25	0.25	0.0	0.25	0.25	0.0	0.9	1.1	20.0	<0.5
meta- and para-Xylene	0.5	0.25	0.25	0.0	0.25	0.25	0.0	0.25	0.25	0.0	4.6	5.9	24.8	<0.5
ortho-Xylene	0.5	0.25	0.25	0.0	0.25	0.25	0.0	0.25	0.25	0.0	1.9	2.4	23.3	<0.5
Total Xylenes	1	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	6.5	8.3	24.3	
Polycyclic Aromatic Hydrocarbon		0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	24.3	
Naphthalene	1 1	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	<1
_ ·	/TDU\	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0	
Total Recoverable Hydrocarbons	r`				-	-		-	-		20	07		.40
TRH C ₆ -C ₁₀	10	<u>5</u>	<u>5</u>	0.0	<u>5</u>	<u>5</u>	0.0	<u>5</u>	<u>5</u>	0.0	28	37	27.7	<10
TRH >C ₁₀ -C ₁₆	50	<u>25</u>	<u>25</u>	0.0	<u>25</u>	<u>25</u>	0.0	<u>25</u>	<u>25</u>	0.0				
TRH >C ₁₆ -C ₃₄	100	<u>50</u>	<u>50</u>	0.0	<u>50</u>	380	153.5	<u>50</u>	<u>50</u>	0.0				
TRH >C ₃₄ -C ₄₀	100	<u>50</u>	<u>50</u>	0.0	<u>50</u>	<u>50</u>	0.0	<u>50</u>	<u>50</u>	0.0				
F1	10	<u>5</u>	<u>5</u>	0.0	<u></u>	<u></u> <u>5</u>	0.0	<u>5</u>	<u>5</u>	0.0	14	18.9	29.8	
F2	50	<u>25</u>	25	0.0	25	25	0.0	25	<u>25</u>	0.0				
Polycyclic Aromatic Hydrocarbon				0.0	===	=2	0.0			0.0		l	1	
Naphthalene	0.5	0.25	0.25	0.0	0.25	3.2	171.0	0.25	0.25	0.0			T	
Acenaphthylene	0.5	0.25	0.25	0.0	0.25	0.8	104.8	0.25	0.25	0.0				
Acenaphthene	0.5	0.25	0.25	0.0	0.25	3.2	171.0	0.25	0.25	0.0				
Fluorene	0.5	0.25	0.25	0.0	0.25	4.7	171.0	0.25	0.25	0.0				
Phenanthrene	0.5	0.25	0.25	0.0	1.1	40.6	189.4	0.25	1	120.0				
Anthracene	0.5	0.25	0.25	0.0	0.25	9.2	189.4	0.25	0.25	0.0				
Fluoranthene	0.5	0.23	0.8	13.3	2.3	37.4	176.8	0.25	1.2	131.0				
Pyrene	0.5	0.6	0.8	28.6	2.4	32.9	170.8	0.25	1.1	125.9				
Benz(a)anthracene	0.5	0.0	0.0	0.0	1	11.6	168.3	0.25	0.25	0.0				
Chrysene	0.5	0.25	0.25	0.0	0.9	10.5	168.4	0.25	0.25	0.0				
Benzo(b)&(j)fluoranthene	0.5	0.25	0.25	0.0	1.3	12.3	161.8	0.25	0.25	0.0				
Benzo(k)fluoranthene	0.5	0.25	0.25	0.0	0.5	5.2	164.9			0.0				
Benzo(a) pyrene	0.5	0.25	0.25	0.0	1	11.6	168.3	0.25 0.25	0.25 0.25	0.0				
Indeno(1,2,3-c,d)pyrene	0.5			0.0	0.5	5.7	167.7			0.0				
Dibenz(a,h)anthracene	0.5	0.25	0.25	0.0	0.5 0.25	1.1	125.9	0.25	0.25	0.0				
		0.25 0.25	0.25 0.25	0.0	0.25	7.1	164.1	0.25	<u>0.25</u>	0.0				
Benzo(g,h,i)perylene	0.5							0.25	0.25					
Carcinogenic PAH (B(a)P equivalent)	1.21	0.605	<u>0.605</u> 5.1	0.0 6.1	1.596	16.356 197.1	164.4	0.605	0.605 6.55	0.0				
Sum of reported PAH	0	4.8	J.1	0.1	13.2	197.1	174.9	4	6.55	48.3			<u> </u>	
Metals	I = I	144		20.0	10	10	0.0	6	0	20.6		1	1	
Arsenic	5	11	9	20.0	10	10	0.0	6	8	28.6				
Cadmium	1	<u>0.5</u>	0.5	0.0	<u>0.5</u>	<u>0.5</u>	0.0	0.5	7	66.7				
Chromium	2	10	10	0.0	6	6	0.0	7		0.0				
Copper	5	22	24	8.7	105	119	12.5	34	27	23.0				
Mercury	0.1	0.05	0.05	0.0	0.2	0.2	0.0	0.05	0.05	0.0				
Lead	5	73	77	5.3	158	141	11.4	131	84	43.7				
Nickel	2	3	5	50.0	10	8	22.2	4	4	0.0				
Zinc	5	664	229	97.4	210	257	20.1	413	925	76.5			L	
Phenol	0.5			0.0			0.0			0.0				
Phenol	0.5	0.25	0.25	0.0	<u>0.25</u>	0.25	0.0	0.25	0.25	0.0				
Pentachlorophenol	2	1	1 1	0.0	<u>1</u>	<u>1</u>	0.0	1 1	1	0.0				
Cyanide			T -				0.0							
Free Cyanide	1	0.5	<u>0.5</u>	0.0	<u>0.5</u>	<u>0.5</u>	0.0	<u>0.5</u>	<u>0.5</u>	0.0				
All units in mg/kg		BOLD identifies	whore DDD re	011140							DOLD identif	i ed where blar	ako s O	

All units in mg/kg

BOLD identifies where RPD results

BOLD identified where blanks >0

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory >50 where sample results are >10 x PQL

>75 where sample results are > 5 to ≤10 x PQL >100 where sample results are >2 to ≤5 x PQL

AD>2.5 * PQL where sample results are ≤2 x PQL

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Results <u>underlined</u> were not detected and are reported as half the detection limit for statistical purpose.

Concrush Pty Ltd Contamination Assessment Racecourse Rd, Teralba RCA ref:13589-401/3, November 2018

Prepared by: RJL Checked by: FB RCA Australia. AWS-TEM-018/15

Sample Identification			FB	TB	RB	TS
Date	Primary		27/06/2018	27/06/2018	27/06/2018	27/06/2018
Duplicate Type	PQL		Field Blank	Trip Blank	Equipment Wash	Trip Spike
Benzene, Toluene, Ethylbenzene	e, Xylene (E	ВТЕ	EX)			
Benzene	0.001		<0.001	<0.001	<0.001	80%
Toluene	0.002		<0.002	<0.002	<0.002	80%
Ethylbenzene	0.002		<0.002	<0.002	<0.002	80%
meta- & para-Xylene	0.002		<0.002	<0.002	<0.002	75%
Ortho-xylene	0.002		<0.002	<0.002	<0.002	80%
Polycyclic Aromatic Hydrocarbo	ns (PAH)					
Naphthalene	0.005		<0.005	<0.005	<0.005	
Total Recoverable Hydrocarbons	s (TRH)					
TRH C ₆ -C ₁₀	0.02		0.02	<0.02	<0.02	
TRH >C ₁₀ -C ₁₆	0.1		<0.1		<0.1	
TRH >C ₁₆ -C ₃₄	0.1		<0.1		<0.1	
TRH >C ₃₄ -C ₄₀	0.1		<0.1		<0.1	
Polycyclic Aromatic Hydrocarbo	ns (PAH)		•			
Acenaphthene	0.001		<0.001	<0.001	<0.001	
Acenaphthylene	0.001		<0.001	<0.001	<0.001	
Anthracene	0.001		<0.001	<0.001	<0.001	
Benz(a)anthracene	0.001		<0.001	<0.001	<0.001	
Benzo(a) pyrene	0.0005		<0.0005	< 0.0005	< 0.0005	
Benzo(b)&(j)fluoranthene	0.001		<0.001	<0.001	<0.001	
Benzo(g,h,i)perylene	0.001		<0.001	<0.001	<0.001	
Benzo(k)fluoranthene	0.001		<0.001	<0.001	<0.001	-
Chrysene	0.001		<0.001	<0.001	<0.001	
Dibenz(a,h)anthracene	0.001		<0.001	<0.001	<0.001	
Fluoranthene	0.001		<0.001	<0.001	<0.001	
Fluorene	0.001		<0.001	<0.001	<0.001	
Indeno(1,2,3-c,d)pyrene	0.001		<0.001	<0.001	<0.001	
Naphthalene	0.001		<0.001	<0.001	<0.001	
Phenanthrene	0.001		<0.001	<0.001	<0.001	
Pyrene	0.001		<0.001	<0.001	<0.001	
Metals						
Arsenic	0.001		<0.001		<0.001	
Cadmium	0.0001		<0.0001		<0.0001	
Chromium	0.001		<0.001		<0.001	
Copper	0.001		0.119		<0.001	
Mercury	0.0001		<0.0001		<0.0001	
Lead	0.001		<0.001		<0.001	
Nickel	0.001		<0.001		<0.001	
Zinc	0.005		0.016		< 0.005	

Note all units in mg/L except for trip spikes results in % recovery

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

Results <u>underlined</u> were not detected and are reported as half the detection limit for statistical purpose. **BOLD identified where** blanks >0

BOLD identified where spikes outside of 70-130% recovery range



CERTIFICATE OF ANALYSIS

Work Order : ES1817814

Client : ROBERT CARR & ASSOCIATES P/L

Contact : DENTON MAULDIN

Address : P O BOX 175

CARRINGTON NSW, AUSTRALIA 2294

Telephone : ---

Project : 13589 RACESCOURES RD, TERALBA

Order number

C-O-C number : ----

Sampler : R.LAMONT

Site : ---

Quote number : SYBQ/400/17

No. of samples received : 31

No. of samples analysed : 31

Page : 1 of 22

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 19-Jun-2018 15:41

Date Analysis Commenced : 20-Jun-2018

Issue Date : 27-Jun-2018 13:34



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories Position	Accreditation Category
----------------------	------------------------

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW Ben Felgendrejeris Senior Acid Sulfate Soil Chemist Brisbane Acid Sulphate Soils, Stafford, QLD Celine Conceicao Senior Spectroscopist Sydney Inorganics, Smithfield, NSW Edwandy Fadjar Organic Coordinator Sydney Inorganics, Smithfield, NSW Edwandy Fadjar Organic Coordinator Sydney Organics, Smithfield, NSW Gerrad Morgan Asbestos Identifier Newcastle - Asbestos, Mayfield West, NSW Ivan Taylor Analyst Sydney Inorganics, Smithfield, NSW

Page : 2 of 22 Work Order : ES1817814

Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



General Comments

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

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

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

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

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

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests
- ~ = Indicates an estimated value.
- EP071: Results of sample QA1 have been confirmed by re-extraction and re-analysis.
- EA200: As only one sample container was submitted for multiple tests for all sample required Asbestos 50g, at the client's request, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 Slight; 2 Moderate; 3 Strong; 4 Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' Asbestos detected by polarised light microscopy including dispersion staining
- EA200: 'No*' No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



dub-Matrix: SOIL Matrix: SOIL)		Clie	ent sample ID	BH1/A	QA2	BH2/A	QA1	TP3/A
<u> </u>	Cli	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-001	ES1817814-002	ES1817814-003	ES1817814-004	ES1817814-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 1	05-110°C)							
Moisture Content		1.0	%	18.6	13.9	10.0	8.9	15.4
A200: AS 4964 - 2004 Identification	of Asbestos in bulk	samples						
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	No	No
A200: 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	6.63	8.49	25.0	18.3	11.6
APPROVED IDENTIFIER:		-		G.MORGAN	G.MORGAN	G.MORGAN	G.MORGAN	G.MORGAN
G005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	11	9	10	10	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	10	10	6	6	10
Copper	7440-50-8	5	mg/kg	22	24	105	119	19
Lead	7439-92-1	5	mg/kg	73	77	158	141	60
Nickel	7440-02-0	2	mg/kg	3	5	10	8	4
Zinc	7440-66-6	5	mg/kg	664	299	210	257	108
G035T: Total Recoverable Mercury	v by FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.2	0.2	<0.1
K026SF: Total CN by Segmented F								
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1	<1	1
P075(SIM)A: Phenolic Compounds			3 3					
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	<2	<2

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	BH1/A	QA2	BH2/A	QA1	TP3/A
	Cli	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-001	ES1817814-002	ES1817814-003	ES1817814-004	ES1817814-005
•				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromati	ic Hydrocarbons - Cont	inued						
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	3.2	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	0.8	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	3.2	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	4.7	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	1.1	40.6	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	9.2	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	0.7	0.8	2.3	37.4	0.6
Pyrene	129-00-0	0.5	mg/kg	0.6	0.8	2.4	32.9	0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	1.0	11.6	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.9	10.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	1.3	12.3	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.5	5.2	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	1.0	11.6	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.5	5.7	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	1.1	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.7	7.1	<0.5
^ Sum of polycyclic aromatic hydrocar	bons	0.5	mg/kg	1.3	1.6	11.7	197	1.1
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	1.3	16.4	<0.5
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	1.6	16.4	0.6
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.8	16.4	1.2
EP080/071: Total Petroleum Hydro	carbons							
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	300	<100
C29 - C36 Fraction		100	mg/kg	<100	<100	<100	110	<100
^ C10 - C36 Fraction (sum)		50	mg/kg	<50	<50	<50	410	<50
EP080/071: Total Recoverable Hyd	rocarbons - NEPM 201	3 Fraction	ns					
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	380	<100
>C34 - C40 Fraction		100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50	<50	<50	380	<50

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Client : ROBERT CARR & ASSOCIATES P/L
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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	BH1/A	QA2	BH2/A	QA1	TP3/A
	CI	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-001	ES1817814-002	ES1817814-003	ES1817814-004	ES1817814-005
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fraction	ns - Continued					
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50	<50	<50	<50	<50
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Sur	rrogates							
Phenol-d6	13127-88-3	0.5	%	69.1	75.6	70.6	70.3	74.2
2-Chlorophenol-D4	93951-73-6	0.5	%	74.2	75.5	73.4	72.3	77.6
2.4.6-Tribromophenol	118-79-6	0.5	%	59.7	62.3	50.8	53.3	60.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	84.9	86.7	87.4	85.0	88.7
Anthracene-d10	1719-06-8	0.5	%	86.4	87.8	87.2	75.1	88.2
4-Terphenyl-d14	1718-51-0	0.5	%	74.8	76.4	76.4	73.7	78.2
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	115	110	118	114	122
Toluene-D8	2037-26-5	0.2	%	115	113	115	115	122
4-Bromofluorobenzene	460-00-4	0.2	%	101	99.3	101	102	105

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP4/B	TP4/C	TP4/3.3 ASS	TP5/B	TP5/3.0 ASS
	Cli	ent sampli	ing date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-006	ES1817814-007	ES1817814-008	ES1817814-009	ES1817814-010
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analy	ysis							
ø pH (F)		0.1	pH Unit			7.4		5.9
ø pH (Fox)		0.1	pH Unit			3.5		2.6
ø Reaction Rate		1	-			2		2
EA055: Moisture Content (Dried @	(105-110°C)							
Moisture Content		1.0	%	16.3	26.9		12.9	
EA200: AS 4964 - 2004 Identification	on of Asbestos in bulk	samples						
Asbestos (Trace)	1332-21-4	5	Fibres	No	No		No	
EA200: AS 4964 - 2004 Identification	on of Asbestos in Soils							
Asbestos Detected	1332-21-4	0.1	g/kg	No	No		No	
Asbestos Type	1332-21-4	-		-	-		-	
Sample weight (dry)		0.01	g	9.12	12.0		16.3	
APPROVED IDENTIFIER:		-		G.MORGAN	G.MORGAN		G.MORGAN	
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	7		<5	
Cadmium	7440-43-9	1	mg/kg	<1	<1		<1	
Chromium	7440-47-3	2	mg/kg	9	7		10	
Copper	7440-50-8	5	mg/kg	5	15		17	
Lead	7439-92-1	5	mg/kg	38	45		125	
Nickel	7440-02-0	2	mg/kg	2	4		5	
Zinc	7440-66-6	5	mg/kg	133	160		145	
EG035T: Total Recoverable Mercu	iry by FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1		<0.1	
EK026SF: Total CN by Segmented	d Flow Analyser							
Total Cyanide	57-12-5	1	mg/kg	<1	<1		<1	
EP075(SIM)A: Phenolic Compound	ds							
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5		<0.5	
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5		<0.5	
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5		<0.5	
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1		<1	
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5		<0.5	
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5		<0.5	
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5		<0.5	
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5		<0.5	
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5		<0.5	

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP4/B	TP4/C	TP4/3.3 ASS	TP5/B	TP5/3.0 ASS
	Clie	ent samplii	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-006	ES1817814-007	ES1817814-008	ES1817814-009	ES1817814-010
•				Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds	s - Continued							
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5		<0.5	
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5		<0.5	
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2		<2	
EP075(SIM)B: Polynuclear Aromatic	c 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		1.4	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5		1.2	
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		0.6	
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 hydrocarl	bons	0.5	mg/kg	<0.5	<0.5		3.7	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5		<0.5	
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6		0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2		1.2	
EP080/071: Total Petroleum Hydrod	carbons							
C6 - C9 Fraction		10	mg/kg	<10	<10		<10	
C10 - C14 Fraction		50	mg/kg	<50	<50		<50	
C15 - C28 Fraction		100	mg/kg	<100	<100		<100	
C29 - C36 Fraction		100	mg/kg	<100	<100		<100	
^ C10 - C36 Fraction (sum)		50	mg/kg	<50	<50		<50	
EP080/071: Total Recoverable Hydr	ocarbons - NEPM 2013	3 Fraction	าร					
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	

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP4/B	TP4/C	TP4/3.3 ASS	TP5/B	TP5/3.0 ASS
	Cli	ent sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-006	ES1817814-007	ES1817814-008	ES1817814-009	ES1817814-010
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fraction	ns - Continued					
>C10 - C16 Fraction		50	mg/kg	<50	<50		<50	
>C16 - C34 Fraction		100	mg/kg	<100	<100		<100	
>C34 - C40 Fraction		100	mg/kg	<100	<100		<100	
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50	<50		<50	
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50	<50		<50	
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2		<0.2	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5		<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5		<0.5	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5		<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5		<0.5	
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2		<0.2	
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5		<0.5	
Naphthalene	91-20-3	1	mg/kg	<1	<1		<1	
EP075(SIM)S: Phenolic Compound Su	rrogates							
Phenol-d6	13127-88-3	0.5	%	74.8	70.8		71.1	
2-Chlorophenol-D4	93951-73-6	0.5	%	80.0	75.5		73.9	
2.4.6-Tribromophenol	118-79-6	0.5	%	65.3	64.0		60.8	
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	90.2	87.4		89.7	
Anthracene-d10	1719-06-8	0.5	%	91.6	87.8		88.1	
4-Terphenyl-d14	1718-51-0	0.5	%	80.0	77.3		77.4	
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	108	95.0		103	
Toluene-D8	2037-26-5	0.2	%	108	94.2		104	
4-Bromofluorobenzene	460-00-4	0.2	%	96.5	93.3		101	

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL Matrix: SOIL)		Clie	ent sample ID	TP6/A	TP6/B	TP7/A	TP7/A ACM	TP8/A
,	Cli	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-011	ES1817814-012	ES1817814-013	ES1817814-014	ES1817814-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @	D 105-110°C)							
Moisture Content		1.0	%	20.4	25.4	12.6		12.8
EA200: AS 4964 - 2004 Identificat	ion of Asbestos in bulk	samples						
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	No	No
EA200: AS 4964 - 2004 Identificat	ion of Asbestos in Soils							
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	Yes	No
Asbestos Type	1332-21-4	-		-	-	-	Ch	-
Sample weight (dry)		0.01	g	13.8	8.68	5.80	18.5	16.2
APPROVED IDENTIFIER:		-		G.MORGAN	G.MORGAN	G.MORGAN	A. SMYLIE	G.MORGAN
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	6	9		<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1		<1
Chromium	7440-47-3	2	mg/kg	9	2	12		4
Copper	7440-50-8	5	mg/kg	10	<5	38		18
Lead	7439-92-1	5	mg/kg	87	33	81		64
Nickel	7440-02-0	2	mg/kg	<2	<2	4		<2
Zinc	7440-66-6	5	mg/kg	42	<5	552		526
EG035T: Total Recoverable Merc	urv by FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1		<0.1
K026SF: Total CN by Segmente	d Flow Analyser							
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1		<1
EP075(SIM)A: Phenolic Compour			3 3					
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1		<1
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2		<2

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP6/A	TP6/B	TP7/A	TP7/A ACM	TP8/A
	Cli	ent samplii	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-011	ES1817814-012	ES1817814-013	ES1817814-014	ES1817814-015
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic	c Hydrocarbons - Cont	inued						
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Fluoranthene	206-44-0	0.5	mg/kg	0.7	<0.5	<0.5		<0.5
Pyrene	129-00-0	0.5	mg/kg	0.8	<0.5	<0.5		<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.5	<0.5	<0.5		<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
^ Sum of polycyclic aromatic hydrocarl	bons	0.5	mg/kg	2.0	<0.5	<0.5		<0.5
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	0.5	<0.5	<0.5		<0.5
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.8	0.6	0.6		0.6
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2		1.2
EP080/071: Total Petroleum Hydrod	carbons							
C6 - C9 Fraction		10	mg/kg	<10	<10	<10		<10
C10 - C14 Fraction		50	mg/kg	<50	<50	<50		<50
C15 - C28 Fraction		100	mg/kg	<100	<100	<100		<100
C29 - C36 Fraction		100	mg/kg	<100	<100	<100		<100
^ C10 - C36 Fraction (sum)		50	mg/kg	<50	<50	<50		<50
EP080/071: Total Recoverable Hydr	ocarbons - NEPM 201	3 Fraction	ns					
C6 - C10 Fraction	C6 C10	10	mg/kg	<10	<10	<10		<10
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg	<10	<10	<10		<10
(F1)								
>C10 - C16 Fraction		50	mg/kg	<50	<50	<50		<50
>C16 - C34 Fraction		100	mg/kg	<100	<100	<100		<100
>C34 - C40 Fraction		100	mg/kg	<100	<100	<100		<100
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50	<50	<50		<50

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP6/A	TP6/B	TP7/A	TP7/A ACM	TP8/A
	CI	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-011	ES1817814-012	ES1817814-013	ES1817814-014	ES1817814-015
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fraction	ns - Continued					
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50	<50	<50		<50
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2		<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2	<0.2		<0.2
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5	<0.5		<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1		<1
EP075(SIM)S: Phenolic Compound Su	rrogates							
Phenol-d6	13127-88-3	0.5	%	73.2	74.4	72.6		76.3
2-Chlorophenol-D4	93951-73-6	0.5	%	77.5	79.4	77.7		78.8
2.4.6-Tribromophenol	118-79-6	0.5	%	60.3	58.8	57.5		48.7
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	87.0	89.8	89.2		84.8
Anthracene-d10	1719-06-8	0.5	%	89.8	89.3	89.1		89.0
4-Terphenyl-d14	1718-51-0	0.5	%	77.6	80.0	78.8		77.3
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	103	106	120		116
Toluene-D8	2037-26-5	0.2	%	103	109	120		113
4-Bromofluorobenzene	460-00-4	0.2	%	95.9	100	105		101

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP8/0.5 ACM	TP8/B	TP9/A	TP9/0.5 ACM	TP9/B
·	Cli	ent sampli	ing date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-016	ES1817814-017	ES1817814-018	ES1817814-019	ES1817814-020
•				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @	ପ୍ତ 105-110°C)							
Moisture Content		1.0	%		14.1	14.0		19.2
EA200: AS 4964 - 2004 Identificat	ion of Asbestos in bulk	samples						
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	No	No
EA200: AS 4964 - 2004 Identificat	ion of Asbestos in Soils							
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	No	No	Yes	No
Asbestos Type	1332-21-4	-		Ch	-	-	Ch	-
Sample weight (dry)		0.01	g	21.0	13.4	12.0	98.8	9.63
APPROVED IDENTIFIER:		-		A. SMYLIE	G.MORGAN	G.MORGAN	A. SMYLIE	G.MORGAN
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg		<5	20		56
Cadmium	7440-43-9	1	mg/kg		<1	<1		<1
Chromium	7440-47-3	2	mg/kg		11	15		11
Copper	7440-50-8	5	mg/kg		7	68		75
Lead	7439-92-1	5	mg/kg		26	296		647
Nickel	7440-02-0	2	mg/kg		<2	4		3
Zinc	7440-66-6	5	mg/kg		75	1610		4150
EG035T: Total Recoverable Merc	urv by FIMS							
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1		0.2
EK026SF: Total CN by Segmente	d Flow Analyser							
Total Cyanide	57-12-5	1	mg/kg		<1	<1		<1
EP075(SIM)A: Phenolic Compoun								
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5		<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5		<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5		<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1		<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5		<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5		<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5		<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5		<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5		<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5		<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5		<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2		<2

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP8/0.5 ACM	TP8/B	TP9/A	TP9/0.5 ACM	TP9/B
· · · · · · · · · · · · · · · · · · ·	Cli	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-016	ES1817814-017	ES1817814-018	ES1817814-019	ES1817814-020
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic	c Hydrocarbons - Cont	inued						
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 hydrocarl	bons	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
EP080/071: Total Petroleum Hydrod	carbons							
C6 - C9 Fraction		10	mg/kg		<10	<10		<10
C10 - C14 Fraction		50	mg/kg		<50	<50		<50
C15 - C28 Fraction		100	mg/kg		<100	<100		<100
C29 - C36 Fraction		100	mg/kg		<100	<100		<100
^ C10 - C36 Fraction (sum)		50	mg/kg		<50	<50		<50
EP080/071: Total Recoverable Hydr	rocarbons - NEPM 201	3 Fraction	ns					
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10		<10
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg		<10	<10		<10
(F1)								
>C10 - C16 Fraction		50	mg/kg		<50	<50		<50
>C16 - C34 Fraction		100	mg/kg		<100	<100		<100
>C34 - C40 Fraction		100	mg/kg		<100	<100		<100
^ >C10 - C40 Fraction (sum)		50	mg/kg		<50	<50		<50

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP8/0.5 ACM	TP8/B	TP9/A	TP9/0.5 ACM	TP9/B
	Cli	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-016	ES1817814-017	ES1817814-018	ES1817814-019	ES1817814-020
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydroca	rbons - NEPM 201	3 Fraction	ns - Continued					
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg		<50	<50		<50
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2		<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5		<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5		<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5		<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5		<0.5
^ Sum of BTEX		0.2	mg/kg		<0.2	<0.2		<0.2
^ Total Xylenes		0.5	mg/kg		<0.5	<0.5		<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1		<1
EP075(SIM)S: Phenolic Compound Sur	rogates							
Phenol-d6	13127-88-3	0.5	%		76.9	75.2		73.5
2-Chlorophenol-D4	93951-73-6	0.5	%		78.6	74.8		75.2
2.4.6-Tribromophenol	118-79-6	0.5	%		48.2	50.4		51.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%		85.8	83.8		84.6
Anthracene-d10	1719-06-8	0.5	%		89.5	87.7		85.8
4-Terphenyl-d14	1718-51-0	0.5	%		78.3	76.9		76.1
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%		116	115		113
Toluene-D8	2037-26-5	0.2	%		115	114		117
4-Bromofluorobenzene	460-00-4	0.2	%		102	102		102

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



ub-Matrix: SOIL Matrix: SOIL)		Clie	ent sample ID	TP10/B	TP11/C	TP12/B	QA3	BH13/B
	CI	ient samplii	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-021	ES1817814-022	ES1817814-023	ES1817814-024	ES1817814-025
•				Result	Result	Result	Result	Result
A055: Moisture Content (Dried @	105-110°C)							
Moisture Content		1.0	%	11.1	15.4	9.7	15.3	17.0
EA200: AS 4964 - 2004 Identificatio	n of Asbestos in bulk	samples						
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	No	No
A200: AS 4964 - 2004 Identificatio	n 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	10.8	6.75	23.0	11.3	15.8
APPROVED IDENTIFIER:		-		G.MORGAN	G.MORGAN	G.MORGAN	G.MORGAN	G.MORGAN
G005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	10	6	8	5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	1	<1
Chromium	7440-47-3	2	mg/kg	7	7	7	7	3
Copper	7440-50-8	5	mg/kg	22	6	34	27	<5
Lead	7439-92-1	5	mg/kg	68	8	131	84	21
Nickel	7440-02-0	2	mg/kg	3	<2	4	4	<2
Zinc	7440-66-6	5	mg/kg	292	15	413	925	44
G035T: Total Recoverable Mercu	rv bv FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
K026SF: Total CN by Segmented	Flow Analyser							
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1	<1	2
:P075(SIM)A: Phenolic Compound			0 0					
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	<2	<2

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP10/B	TP11/C	TP12/B	QA3	BH13/B
	Cli	ient samplii	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-021	ES1817814-022	ES1817814-023	ES1817814-024	ES1817814-025
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromati	c Hydrocarbons - Cont	inued						
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	1.0	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	1.2	0.7
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	1.1	0.6
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocar	bons	0.5	mg/kg	<0.5	<0.5	<0.5	3.3	1.3
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrod	carbons							
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 Hydi	rocarbons - NEPM 201	3 Fraction	ns					
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
(F1)	_							
>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

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			TP10/B	TP11/C	TP12/B	QA3	BH13/B
	CI	ient sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00	18-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-021	ES1817814-022	ES1817814-023	ES1817814-024	ES1817814-025
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3 Fraction	ns - Continued					
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50	<50	<50	<50	<50
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Su	rrogates							
Phenol-d6	13127-88-3	0.5	%	75.1	76.5	71.4	73.8	72.4
2-Chlorophenol-D4	93951-73-6	0.5	%	74.3	78.5	73.2	75.4	76.0
2.4.6-Tribromophenol	118-79-6	0.5	%	52.2	56.4	50.0	52.5	52.3
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	82.7	86.5	82.9	84.7	83.5
Anthracene-d10	1719-06-8	0.5	%	83.3	83.8	81.6	87.9	86.5
4-Terphenyl-d14	1718-51-0	0.5	%	75.0	75.6	72.5	74.2	74.0
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	116	102	111	96.5	106
Toluene-D8	2037-26-5	0.2	%	113	95.2	110	94.3	106
4-Bromofluorobenzene	460-00-4	0.2	%	102	91.1	97.7	91.3	94.8

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP13/C	TP13/C 2.0 ASS	TRIP BLANK	TRIP SPIKE	TSC
	Ci	lient sampli	ing date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	14-Jun-2018 00:00	12-Jun-2018 00:00	12-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-026	ES1817814-027	ES1817814-028	ES1817814-029	ES1817814-030
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analy	rsis							
ø pH (F)		0.1	pH Unit		4.8			
ø pH (Fox)		0.1	pH Unit		2.0			
ø Reaction Rate		1	-		2			
EA055: Moisture Content (Dried @	105-110°C)							
Moisture Content		1.0	%	17.2				
EA200: AS 4964 - 2004 Identification	on of Asbestos in bulk	samples						
Asbestos (Trace)	1332-21-4	5	Fibres	No				
EA200: AS 4964 - 2004 Identification	on 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	13.9				
APPROVED IDENTIFIER:		-		G.MORGAN				
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5				
Cadmium	7440-43-9	1	mg/kg	<1				
Chromium	7440-47-3	2	mg/kg	2				
Copper	7440-50-8	5	mg/kg	<5				
Lead	7439-92-1	5	mg/kg	8				
Nickel	7440-02-0	2	mg/kg	<2				
Zinc	7440-66-6	5	mg/kg	5				
EG035T: Total Recoverable Mercu	iry 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				
EP075(SIM)A: Phenolic Compound	ls							
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	1	mg/kg	<1				
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				

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP13/C	TP13/C 2.0 ASS	TRIP BLANK	TRIP SPIKE	TSC
	Cli	ent sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	14-Jun-2018 00:00	12-Jun-2018 00:00	12-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-026	ES1817814-027	ES1817814-028	ES1817814-029	ES1817814-030
•				Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compound	s - Continued							
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5				
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5				
Pentachlorophenol	87-86-5	2	mg/kg	<2				
EP075(SIM)B: Polynuclear Aromati	c Hydrocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5				
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5				
Acenaphthene	83-32-9	0.5	mg/kg	<0.5				
Fluorene	86-73-7	0.5	mg/kg	<0.5				
Phenanthrene	85-01-8	0.5	mg/kg	<0.5				
Anthracene	120-12-7	0.5	mg/kg	<0.5				
Fluoranthene	206-44-0	0.5	mg/kg	<0.5				
Pyrene	129-00-0	0.5	mg/kg	<0.5				
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 hydrocar	bons	0.5	mg/kg	<0.5				
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5				
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6				
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2				
EP080/071: Total Petroleum Hydrod	carbons							
C6 - C9 Fraction		10	mg/kg	<10		<10	22	30
C10 - C14 Fraction		50	mg/kg	<50				
C15 - C28 Fraction		100	mg/kg	<100				
C29 - C36 Fraction		100	mg/kg	<100				
^ C10 - C36 Fraction (sum)		50	mg/kg	<50				
EP080/071: Total Recoverable Hydi	rocarbons - NEPM 201	3 Fractio	ns					
C6 - C10 Fraction	C6_C10	10	mg/kg	<10		<10	28	37
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10		<10	14	19

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	TP13/C	TP13/C 2.0 ASS	TRIP BLANK	TRIP SPIKE	TSC
	Cli	ent sampli	ng date / time	18-Jun-2018 00:00	18-Jun-2018 00:00	14-Jun-2018 00:00	12-Jun-2018 00:00	12-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	ES1817814-026	ES1817814-027	ES1817814-028	ES1817814-029	ES1817814-030
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fraction	ns - Continued					
>C10 - C16 Fraction		50	mg/kg	<50				
>C16 - C34 Fraction		100	mg/kg	<100				
>C34 - C40 Fraction		100	mg/kg	<100				
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50				
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50				
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2		<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5		<0.5	6.5	8.6
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5		<0.5	0.9	1.1
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5		<0.5	4.6	5.9
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5		<0.5	1.9	2.4
^ Sum of BTEX		0.2	mg/kg	<0.2		<0.2	13.9	18.0
^ Total Xylenes		0.5	mg/kg	<0.5		<0.5	6.5	8.3
Naphthalene	91-20-3	1	mg/kg	<1		<1	<1	<1
EP075(SIM)S: Phenolic Compound Su	rrogates							
Phenol-d6	13127-88-3	0.5	%	73.8				
2-Chlorophenol-D4	93951-73-6	0.5	%	71.4				
2.4.6-Tribromophenol	118-79-6	0.5	%	56.4				
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	86.4				
Anthracene-d10	1719-06-8	0.5	%	88.7				
4-Terphenyl-d14	1718-51-0	0.5	%	75.4				
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	92.0		107	115	107
Toluene-D8	2037-26-5	0.2	%	93.4		102	113	104
4-Bromofluorobenzene	460-00-4	0.2	%	101		101	108	104

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			TP12/3.0-ASS	 	
	lient sampli	ng date / time	18-Jun-2018 00:00	 	 	
Compound	CAS Number	LOR	Unit	ES1817814-031	 	
				Result	 	
EA037: Ass Field Screening Analysis						
ø pH (F)		0.1	pH Unit	5.8	 	
ø pH (Fox)		0.1	pH Unit	2.9	 	
ø Reaction Rate		1	-	2	 	

Analytical Results

Descriptive Results

Sub-Matrix: SOIL

Sub-Matrix: SOIL		
Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of	of Asbestos in Soils	
EA200: Description	BH1/A - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	QA2 - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	BH2/A - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	QA1 - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP3/A - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP4/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP4/C - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP5/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP6/A - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP6/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP7/A - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP7/A ACM - 18-Jun-2018 00:00	One piece of asbestos cement sheeting approximately 70x40x5mm
EA200: Description	TP8/A - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP8/0.5 ACM - 18-Jun-2018 00:00	One piece of asbestos cement sheeting approximately 65x40x5mm
EA200: Description	TP8/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP9/A - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP9/0.5 ACM - 18-Jun-2018 00:00	One piece of asbestos cement sheeting approximately 120x70x5mm
EA200: Description	TP9/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP10/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP11/C - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP12/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	QA3 - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	BH13/B - 18-Jun-2018 00:00	Mid brown sandy soil.
EA200: Description	TP13/C - 18-Jun-2018 00:00	Mid brown sandy soil.

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130



QUALITY CONTROL REPORT

Work Order : ES1817814

Client : ROBERT CARR & ASSOCIATES P/L

Contact : DENTON MAULDIN

Address : P O BOX 175

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Telephone : ---

Project : 13589 RACESCOURES RD, TERALBA

Order number

C-O-C number : ----

Sampler : R.LAMONT

Site : ---

Quote number : SYBQ/400/17

No. of samples received : 31
No. of samples analysed : 31

Page : 1 of 14

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 19-Jun-2018

Date Analysis Commenced : 20-Jun-2018

Issue Date : 27-Jun-2018



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

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

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
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Gerrad Morgan	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



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 (%)
EA037: Ass Field S	creening Analysis (QC	Lot: 1747909)							
ES1817678-006	Anonymous	EA037: pH (F)		0.1	pH Unit	8.3	8.3	0.00	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	5.0	5.0	0.00	0% - 20%
ES1817814-027	TP13/C 2.0 ASS	EA037: pH (F)		0.1	pH Unit	4.8	4.9	2.06	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.0	2.0	0.00	0% - 20%
EA055: Moisture Co	ontent (Dried @ 105-110	°C) (QC Lot: 1742516)							
ES1817814-001	BH1/A	EA055: Moisture Content		0.1	%	18.6	18.4	1.09	0% - 50%
ES1817814-015	TP8/A	EA055: Moisture Content		0.1	%	12.8	12.3	3.99	0% - 50%
EA055: Moisture Co	ontent (Dried @ 105-110	°C) (QC Lot: 1742517)							
ES1817814-026	TP13/C	EA055: Moisture Content		0.1	%	17.2	17.4	1.19	0% - 50%
ES1817989-003	Anonymous	EA055: Moisture Content		0.1	%	52.1	52.3	0.337	0% - 20%
EG005T: Total Meta	Is by ICP-AES (QC Lot	: 1748883)							
ES1817782-001	Anonymous	EG005T: Lead	7439-92-1	5	mg/kg	296	328	10.1	0% - 20%
ES1817782-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	53	62	15.8	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	18	25	31.6	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	220	230	4.51	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	982	906	8.08	0% - 20%
ES1817782-021	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	46	48	3.35	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	19	30	45.6	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	362	405	11.1	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	320	305	4.87	0% - 20%

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Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005T: Total Meta	Is by ICP-AES (QC Lo	t: 1748883) - continued							
ES1817782-021	Anonymous	EG005T: Zinc	7440-66-6	5	mg/kg	944	1010	7.04	0% - 20%
EG005T: Total Meta	Is by ICP-AES (QC Lo	t: 1748885)							
ES1817814-012	TP6/B	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	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	8	28.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	33	33	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
ES1817814-025	BH13/B	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	3	3	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	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	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	21	21	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	44	69	43.2	0% - 50%
EG035T: Total Rec	overable Mercury by F	IMS (QC Lot: 1748884)							
ES1817782-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1817782-021	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Rec	overable Mercury by F	IMS (QC Lot: 1748886)							
ES1817814-012	TP6/B	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1817814-025	BH13/B	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK026SF: Total CN	by Segmented Flow A	Analyser (QC Lot: 1748411)							
ES1817814-009	TP5/B	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1817766-001	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	9	13	36.1	0% - 50%
EK026SF: Total CN	by Segmented Flow A	Analyser (QC Lot: 1748413)							
ES1817814-024	QA3	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1818109-002	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	1	<1	0.00	No Limit
EP075(SIM)A: Phen	olic Compounds (QC	Lot: 1738849)							
ES1817814-001	BH1/A	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)A: Pheno	olic Compounds (QC L	ot: 1738849) - continued							
ES1817814-001	BH1/A	EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
ES1817814-013	TP7/A	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)A: Pheno	olic Compounds (QC L	ot: 1738881)							
ES1817672-039	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	·	EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
ES1817841-013	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)B: Polyn	uclear Aromatic Hydro	carbons (QC Lot: 1738849)							

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Sub-Matrix: SOIL						Laboratory I	Ouplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynu	ıclear Aromatic Hydrocarb	ons (QC Lot: 1738849) - continued							
ES1817814-001	BH1/A	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	0.7	0.5	27.7	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.6	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	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): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	1.3	0.5	88.9	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1817814-013	TP7/A	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	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): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL						Laboratory I	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: Polynu	uclear Aromatic Hydrocark	oons (QC Lot: 1738881)							
ES1817672-039	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1817841-013	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	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): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total P	etroleum Hydrocarbons	(QC Lot: 1738850)							
ES1817814-001	BH1/A	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
ES1817814-013	TP7/A	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 P	etroleum Hydrocarbons	(QC Lot: 1738880)							
ES1817672-039	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
ES1817841-013	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 P	etroleum Hydrocarbons	(QC Lot: 1739141)							
ES1817814-001	BH1/A	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
ES1817814-013	TP7/A	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total P	etroleum Hydrocarbons	(QC Lot: 1739160)							
ES1817841-003	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
ES1817841-020	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total R	ecoverable Hydrocarbor	ns - NEPM 2013 Fractions (QC Lot: 1738850)							
ES1817814-001	BH1/A	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
ES1817814-013	TP7/A	EP071: >C16 - C34 Fraction		100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction		100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction		50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total R	ecoverable Hydrocarbor	ns - NEPM 2013 Fractions (QC Lot: 1738880)							
ES1817672-039	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
ES1817841-013	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
EP080/071: Total R	ecoverable Hydrocarbor	ns - NEPM 2013 Fractions (QC Lot: 1739141)							
ES1817814-001	BH1/A	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1817814-013	TP7/A	EP080: C6 - C10 Fraction	 C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total R	ecoverable Hydrocarbor	ns - NEPM 2013 Fractions (QC Lot: 1739160)	_						
ES1817841-003	Anonymous	EP080: C6 - C10 Fraction	C6 C10	10	mg/kg	<10	<10	0.00	No Limit
		Li 000. Ou - O lo i laction	55_510					0.00	

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Sub-Matrix: SOIL						Laboratory I	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: 1739141)								
ES1817814-001	BH1/A	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1817814-013	TP7/A	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC	Lot: 1739160)								
ES1817841-003	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1817841-020	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



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

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

Sub-Matrix: SOIL				Method Blank (MB)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1748883)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	102	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	99.4	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	89.8	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	106	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	97.9	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	101	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	109	80	122
EG005T: Total Metals by ICP-AES (QCLot: 1748885)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	102	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	92.1	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	102	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	101	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	104	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	117	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot	: 1748884)							
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	76.1	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot	: 1748886)							
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	83.2	70	105
EK026SF: Total CN by Segmented Flow Analyser (Q	CLot: 1748411)							
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	109	81	129
EK026SF: Total CN by Segmented Flow Analyser (Q	CL of: 1748413)							
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	112	81	129
EP075(SIM)A: Phenolic Compounds (QCLot: 1738849)							
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	86.2	71	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	92.1	72	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	87.9	71	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	89.3	67	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	67.8	54	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	84.5	68	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	85.4	66	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	91.8	70	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	80.6	70	116

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 1738849) -	continued								
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	78.2	54	114	
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	83.5	60	114	
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	23.4	10	57	
EP075(SIM)A: Phenolic Compounds (QCLot: 1738881)									
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	87.6	71	125	
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	90.2	72	124	
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	88.2	71	123	
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	87.8	67	127	
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	77.9	54	114	
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	92.7	68	126	
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	86.9	66	120	
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	91.5	70	120	
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	85.0	70	116	
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	79.4	54	114	
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	85.1	60	114	
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	37.6	10	57	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCL	ot: 1738849)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	94.3	77	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	95.3	72	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	96.6	73	127	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	95.3	72	126	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	98.5	75	127	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	99.1	77	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	101	73	127	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	102	74	128	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	85.7	69	123	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	96.8	75	127	
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	87.1	68	116	
	205-82-3								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	99.2	74	126	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	95.5	70	126	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	80.5	61	121	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	80.0	62	118	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	74.6	63	121	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCL									
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	98.4	77	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	100	72	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	99.8	73	127	

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Sub-Matrix: SOIL			Method Blank (MB)		Laboratory Control Spike (LC	S) Report	
			Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound CAS Nu	mber LOR	Unit	Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 173888	l) - continued						
EP075(SIM): Fluorene 86-	3-7 0.5	mg/kg	<0.5	6 mg/kg	99.7	72	126
EP075(SIM): Phenanthrene 85-	1-8 0.5	mg/kg	<0.5	6 mg/kg	105	75	127
EP075(SIM): Anthracene 120-	2-7 0.5	mg/kg	<0.5	6 mg/kg	105	77	127
EP075(SIM): Fluoranthene 206-	4-0 0.5	mg/kg	<0.5	6 mg/kg	107	73	127
EP075(SIM): Pyrene 129-	0-0 0.5	mg/kg	<0.5	6 mg/kg	108	74	128
EP075(SIM): Benz(a)anthracene 56-	5-3 0.5	mg/kg	<0.5	6 mg/kg	91.6	69	123
EP075(SIM): Chrysene 218-	1-9 0.5	mg/kg	<0.5	6 mg/kg	99.4	75	127
EP075(SIM): Benzo(b+j)fluoranthene 205-6		mg/kg	<0.5	6 mg/kg	94.3	68	116
EP075(SIM): Benzo(k)fluoranthene 207-	8-9 0.5	mg/kg	<0.5	6 mg/kg	108	74	126
EP075(SIM): Benzo(a)pyrene 50-	2-8 0.5	mg/kg	<0.5	6 mg/kg	103	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	9-5 0.5	mg/kg	<0.5	6 mg/kg	98.2	61	121
EP075(SIM): Dibenz(a.h)anthracene 53-	0-3 0.5	mg/kg	<0.5	6 mg/kg	96.2	62	118
EP075(SIM): Benzo(g.h.i)perylene 191-2	4-2 0.5	mg/kg	<0.5	6 mg/kg	95.8	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1738850)							
EP071: C10 - C14 Fraction	50	mg/kg	<50	200 mg/kg	103	75	129
EP071: C15 - C28 Fraction	100	mg/kg	<100	300 mg/kg	106	77	131
EP071: C29 - C36 Fraction	100	mg/kg	<100	200 mg/kg	96.0	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1738880)							
EP071: C10 - C14 Fraction	50	mg/kg	<50	200 mg/kg	98.8	75	129
EP071: C15 - C28 Fraction	100	mg/kg	<100	300 mg/kg	108	77	131
EP071: C29 - C36 Fraction	100	mg/kg	<100	200 mg/kg	96.2	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1739141)							
EP080: C6 - C9 Fraction	10	mg/kg	<10	26 mg/kg	103	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1739160)							
EP080: C6 - C9 Fraction	10	mg/kg	<10	26 mg/kg	112	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	(QCLot: 1738850)						
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	101	74	138
EP071: >C34 - C40 Fraction	100	mg/kg	<100	150 mg/kg	95.0	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	(QCLot: 1738880)						
EP071: >C10 - C16 Fraction	50	mg/kg	<50	250 mg/kg	100	77	125
EP071: >C16 - C34 Fraction	100	mg/kg	<100	350 mg/kg	107	74	138
EP071: >C34 - C40 Fraction	100	mg/kg	<100	150 mg/kg	85.9	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	(QCLot: 1739141)						
EP080: C6 - C10 Fraction C6_		mg/kg	<10	31 mg/kg	108	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions	(QCLot: 1739160)						
EP080: C6 - C10 Fraction C6_	C10 10	mg/kg	<10	31 mg/kg	117	68	128

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Sub-Matrix: SOIL			Method Blank (MB)	Laboratory Control Spike (LCS) Report				
			Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound CAS Num	ber LOR	Unit	Result	Concentration	LCS	Low	High	
EP080: BTEXN (QCLot: 1739141)								
EP080: Benzene 71-43	-2 0.2	mg/kg	<0.2	1 mg/kg	103	62	116	
EP080: Toluene 108-88	-3 0.5	mg/kg	<0.5	1 mg/kg	115	67	121	
EP080: Ethylbenzene 100-47	-4 0.5	mg/kg	<0.5	1 mg/kg	108	65	117	
EP080: meta- & para-Xylene 108-38	-3 0.5	mg/kg	<0.5	2 mg/kg	108	66	118	
106-42	-3							
EP080: ortho-Xylene 95-47	-6 0.5	mg/kg	<0.5	1 mg/kg	106	68	120	
EP080: Naphthalene 91-20	-3 1	mg/kg	<1	1 mg/kg	104	63	119	
EP080: BTEXN (QCLot: 1739160)								
EP080: Benzene 71-43	-2 0.2	mg/kg	<0.2	1 mg/kg	111	62	116	
EP080: Toluene 108-88	-3 0.5	mg/kg	<0.5	1 mg/kg	110	67	121	
EP080: Ethylbenzene 100-47	-4 0.5	mg/kg	<0.5	1 mg/kg	107	65	117	
EP080: meta- & para-Xylene 108-38	-3 0.5	mg/kg	<0.5	2 mg/kg	106	66	118	
106-42	-3							
EP080: ortho-Xylene 95-47	-6 0.5	mg/kg	<0.5	1 mg/kg	108	68	120	
EP080: Naphthalene 91-20	-3 1	mg/kg	<1	1 mg/kg	101	63	119	

Matrix Spike (MS) Report

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

ub-Matrix: SOIL				Ma	atrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
aboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
G005T: Total Met	als by ICP-AES (QCLot: 1748883)						
S1817782-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	109	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	99.0	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	83.7	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	93.4	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	120	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	93.0	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	73.6	70	130
G005T: Total Met	als by ICP-AES (QCLot: 1748885)						
S1817814-012	TP6/B	EG005T: Arsenic	7440-38-2	50 mg/kg	94.2	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	99.1	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	96.7	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	99.6	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	95.2	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	99.2	70	130

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Sub-Matrix: SOIL			Ī	Matrix Spike (MS) Report					
				Spike	SpikeRecovery(%)	Recovery Li	mits (%)		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
EG005T: Total Me	tals by ICP-AES (QCLot: 1748885) - continued								
ES1817814-012	TP6/B	EG005T: Zinc	7440-66-6	250 mg/kg	104	70	130		
EG035T: Total Re	ecoverable Mercury by FIMS (QCLot: 1748884)								
ES1817782-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	93.6	70	130		
EG035T: Total Re	ecoverable Mercury by FIMS (QCLot: 1748886)								
ES1817814-012	TP6/B	EG035T: Mercury	7439-97-6	5 mg/kg	86.9	70	130		
FK026SE: Total C	N by Segmented Flow Analyser (QCLot: 1748411)	20001111010019		3 3					
ES1817766-001	Anonymous	EK026SF: Total Cyanide	57-12-5	40 mg/kg	118	70	130		
	,	EN0203F. Total Cyanilde	57-12-5	40 mg/kg	110	70	100		
	N by Segmented Flow Analyser (QCLot: 1748413)		57.40.5	40	400	70	100		
ES1817814-024	QA3	EK026SF: Total Cyanide	57-12-5	40 mg/kg	120	70	130		
` '	enolic Compounds (QCLot: 1738849)								
ES1817814-001	BH1/A	2. 6. 6(6)	108-95-2	10 mg/kg	84.7	70	130		
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	90.0	70	130		
		(-····)· - · ···· -	88-75-5	10 mg/kg	72.8	60	130		
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	83.8	70	130		
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	57.8	20	130		
EP075(SIM)A: Phe	enolic Compounds (QCLot: 1738881)								
ES1817672-039	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	81.8	70	130		
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	84.5	70	130		
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	76.4	60	130		
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	80.7	70	130		
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	35.1	20	130		
EP075(SIM)B: Poly	ynuclear Aromatic Hydrocarbons (QCLot: 1738849)								
ES1817814-001	BH1/A	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	88.7	70	130		
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	99.3	70	130		
EP075(SIM)B: Poly	ynuclear Aromatic Hydrocarbons (QCLot: 1738881)								
ES1817672-039	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	87.5	70	130		
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	102	70	130		
EP080/071: Total F	Petroleum Hydrocarbons (QCLot: 1738850)								
ES1817814-001	BH1/A	EP071: C10 - C14 Fraction -		523 mg/kg	90.4	73	137		
				2319 mg/kg	108	53	131		
		EP071: C29 - C36 Fraction -		1714 mg/kg	117	52	132		
EP080/071: Total I	Petroleum Hydrocarbons (QCLot: 1738880)								
ES1817672-039	Anonymous	EP071: C10 - C14 Fraction -		523 mg/kg	91.9	73	137		
		EP071: C15 - C28 Fraction -		2319 mg/kg	111	53	131		
		EP071: C29 - C36 Fraction -		1714 mg/kg	123	52	132		

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Sub-Matrix: SOIL				Ma	Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery L	imits (%)		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
EP080/071: Total F	Petroleum Hydrocarbons (QCLot: 1739141)								
ES1817814-001	BH1/A	EP080: C6 - C9 Fraction		32.5 mg/kg	103	70	130		
EP080/071: Total I	Petroleum Hydrocarbons (QCLot: 1739160)								
ES1817841-003	Anonymous	EP080: C6 - C9 Fraction		32.5 mg/kg	101	70	130		
EP080/071: Total I	Recoverable Hydrocarbons - NEPM 2013 Fractions(C	CLot: 1738850)							
ES1817814-001	BH1/A	EP071: >C10 - C16 Fraction		860 mg/kg	97.2	73	137		
		EP071: >C16 - C34 Fraction		3223 mg/kg	113	53	131		
		EP071: >C34 - C40 Fraction		1058 mg/kg	112	52	132		
EP080/071: Total I	Recoverable Hydrocarbons - NEPM 2013 Fractions(C	CLot: 1738880)							
ES1817672-039	Anonymous	EP071: >C10 - C16 Fraction		860 mg/kg	103	73	137		
		EP071: >C16 - C34 Fraction		3223 mg/kg	116	53	131		
		EP071: >C34 - C40 Fraction		1058 mg/kg	121	52	132		
EP080/071: Total I	Recoverable Hydrocarbons - NEPM 2013 Fractions(C	CLot: 1739141)							
ES1817814-001	BH1/A	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	102	70	130		
EP080/071: Total I	Recoverable Hydrocarbons - NEPM 2013 Fractions(C	CLot: 1739160)							
ES1817841-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	102	70	130		
EP080: BTEXN (C	CLot: 1739141)								
ES1817814-001	BH1/A	EP080: Benzene	71-43-2	2.5 mg/kg	91.7	70	130		
		EP080: Toluene	108-88-3	2.5 mg/kg	93.6	70	130		
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	91.5	70	130		
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	87.9	70	130		
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.5	70	130		
		EP080: Naphthalene	91-20-3	2.5 mg/kg	84.4	70	130		
EP080: BTEXN (C	(CLot: 1739160)								
ES1817841-003	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	92.5	70	130		
		EP080: Toluene	108-88-3	2.5 mg/kg	90.2	70	130		
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	90.3	70	130		
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	87.2	70	130		
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	90.8	70	130		
		EP080: Naphthalene	91-20-3	2.5 mg/kg	92.4	70	130		



QA/QC Compliance Assessment to assist with Quality Review

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Client : ROBERT CARR & ASSOCIATES P/L Laboratory : Environmental Division Sydney

Contact : DENTON MAULDIN Telephone : +61-2-8784 8555
Project : 13589 RACESCOURES RD, TERALBA Date Samples Received : 19-Jun-2018

Site : --- Issue Date : 27-Jun-2018

Sampler : R.LAMONT No. of samples received : 31
Order number : No. of samples analysed : 31

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

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

Summary of Outliers

Outliers: Quality Control Samples

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

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

Outliers: Analysis Holding Time Compliance

NO Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

• NO Quality Control Sample Frequency Outliers exist.

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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

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

Holding times for <u>VOC in soils</u> 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: \checkmark = Within holding time.

Method		Sample Date	E	ktraction / Preparation		Analysis				
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EA037: Ass Field Screening Analysis										
Snap Lock Bag - frozen on receipt at ALS (EA										
TP4/3.3 ASS,	TP5/3.0 ASS,	18-Jun-2018	25-Jun-2018	15-Dec-2018	✓	25-Jun-2018	15-Dec-2018	✓		
TP13/C 2.0 ASS,	TP12/3.0-ASS									
EA055: Moisture Content (Dried @ 105-110°	C)									
Soil Glass Jar - Unpreserved (EA055)										
BH1/A,	QA2,	18-Jun-2018				21-Jun-2018	02-Jul-2018	✓		
BH2/A,	QA1,									
TP3/A,	TP4/B,									
TP4/C,	TP5/B,									
TP6/A,	TP6/B,									
TP7/A,	TP8/A,									
TP8/B,	TP9/A,									
TP9/B,	TP10/B,									
TP11/C,	TP12/B,									
QA3,	BH13/B,									
TP13/C										
EA200: AS 4964 - 2004 Identification of Asbe	estos in hulk samples					1	!			
Snap Lock Bag - ACM/Asbestos Grab Bag (E	•									
TP7/A ACM,	TP8/0.5 ACM,	18-Jun-2018				21-Jun-2018	15-Dec-2018	1		
TP9/0.5 ACM	,							,		
Snap Lock Bag - Subsampled by ALS (EA200))									
BH1/A,	QA2,	18-Jun-2018				22-Jun-2018	15-Dec-2018	✓		
BH2/A,	QA1,							•		
TP3/A,	TP4/B,									
TP4/C,	TP5/B,									
TP6/A,	TP6/B,									
TP7/A,	TP8/A,									
TP8/B,	TP9/A,									
TP9/B,	TP10/B,									
TP11/C,	TP12/B,									
QA3,	BH13/B,									
TP13/C	DI 13/D,									
1P13/C										

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TP7/A,

TP8/B,

TP9/B,

TP11/C,

TP13/C

QA3,

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TP8/A,

TP9/A,

TP10/B,

TP12/B,

BH13/B,



Evaluation: **x** = Holding time breach ; ✓ = Within holding time. Matrix: SOIL 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 - ACM/Asbestos Grab Bag (EA200) 18-Jun-2018 21-Jun-2018 15-Dec-2018 TP7/A ACM, TP8/0.5 ACM TP9/0.5 ACM Snap Lock Bag - Subsampled by ALS (EA200) 18-Jun-2018 22-Jun-2018 15-Dec-2018 BH1/A, QA2, BH2/A, QA1, TP3/A, TP4/B, TP4/C, TP5/B. TP6/A. TP6/B. TP7/A, TP8/A, TP8/B, TP9/A. TP9/B, TP10/B, TP11/C. TP12/B, QA3, BH13/B, TP13/C EG005T: Total Metals by ICP-AES Soil Glass Jar - Unpreserved (EG005T) 15-Dec-2018 15-Dec-2018 23-Jun-2018 25-Jun-2018 BH1/A. QA2. 18-Jun-2018 BH2/A, QA1, TP3/A. TP4/B. TP4/C. TP5/B. TP6/A, TP6/B, TP7/A, TP8/A, TP8/B. TP9/A. TP9/B, TP10/B, TP11/C. TP12/B, QA3. BH13/B. TP13/C EG035T: Total Recoverable Mercury by FIMS Soil Glass Jar - Unpreserved (EG035T) 18-Jun-2018 23-Jun-2018 16-Jul-2018 25-Jun-2018 16-Jul-2018 BH1/A, QA2, BH2/A, QA1, TP3/A, TP4/B, TP4/C, TP5/B. TP6/A, TP6/B.

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QA3

BH13/B

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Project : 13589 RACESCOURES RD, TERALBA



Matrix: SOIL Evaluation: **x** = 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 Soil Glass Jar - Unpreserved (EK026SF) 18-Jun-2018 22-Jun-2018 02-Jul-2018 25-Jun-2018 06-Jul-2018 BH1/A, QA2, BH2/A. QA1, TP3/A, TP4/B, TP4/C, TP5/B. TP6/A, TP6/B. TP7/A. TP8/A, TP8/B, TP9/A, TP9/B, TP10/B, TP11/C, TP12/B, QA3, BH13/B, TP13/C EP075(SIM)A: Phenolic Compounds Soil Glass Jar - Unpreserved (EP075(SIM)) 02-Jul-2018 18-Jun-2018 20-Jun-2018 21-Jun-2018 30-Jul-2018 TP13/C Soil Glass Jar - Unpreserved (EP075(SIM)) 31-Jul-2018 18-Jun-2018 21-Jun-2018 02-Jul-2018 24-Jun-2018 BH1/A, QA2. BH2/A. QA1, TP3/A, TP4/B, TP4/C. TP5/B. TP6/A. TP6/B. TP7/A, TP8/A, TP8/B, TP9/A, TP9/B, TP10/B TP11/C, TP12/B, QA3 BH13/B EP075(SIM)B: Polynuclear Aromatic Hydrocarbons Soil Glass Jar - Unpreserved (EP075(SIM)) 18-Jun-2018 20-Jun-2018 02-Jul-2018 1 21-Jun-2018 30-Jul-2018 TP13/C Soil Glass Jar - Unpreserved (EP075(SIM)) 02-Jul-2018 31-Jul-2018 18-Jun-2018 21-Jun-2018 1 24-Jun-2018 BH1/A, QA2, BH2/A, QA1, TP3/A, TP4/B, TP4/C, TP5/B. TP6/A, TP6/B. TP7/A, TP8/A, TP8/B, TP9/A, TP9/B, TP10/B, TP11/C, TP12/B,

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



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

IVIALITIA. SOIL			Evaluation: ~ - Holding time							
Method		Sample Date	E:	xtraction / Preparation		Analysis				
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EP080/071: Total Petroleum Hydrocarbons										
Soil Glass Jar - Unpreserved (EP080)										
TRIP SPIKE,	TSC	12-Jun-2018	20-Jun-2018	26-Jun-2018	✓	22-Jun-2018	26-Jun-2018	✓		
Soil Glass Jar - Unpreserved (EP080) TRIP BLANK		14-Jun-2018	20-Jun-2018	28-Jun-2018	✓	22-Jun-2018	28-Jun-2018	✓		
Soil Glass Jar - Unpreserved (EP071)										
TP13/C		18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	21-Jun-2018	30-Jul-2018	✓		
Soil Glass Jar - Unpreserved (EP080) TP13/C		18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	22-Jun-2018	02-Jul-2018	✓		
Soil Glass Jar - Unpreserved (EP080)										
BH1/A,	QA2,	18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	25-Jun-2018	02-Jul-2018	✓		
BH2/A,	QA1,									
TP3/A,	TP4/B,									
TP4/C,	TP5/B,									
TP6/A,	TP6/B,									
TP7/A,	TP8/A,									
TP8/B,	TP9/A,									
TP9/B,	TP10/B,									
TP11/C,	TP12/B,									
QA3,	BH13/B									
Soil Glass Jar - Unpreserved (EP071)										
BH1/A,	QA2,	18-Jun-2018	21-Jun-2018	02-Jul-2018	✓	25-Jun-2018	31-Jul-2018	✓		
BH2/A,	QA1,									
TP3/A,	TP4/B,									
TP4/C,	TP5/B,									
TP6/A,	TP6/B,									
TP7/A,	TP8/A,									
TP8/B,	TP9/A,									
TP9/B,	TP10/B,									
TP11/C,	TP12/B,									
QA3,	BH13/B									

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



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

Matrix: SOIL			Evaluation: * = Holding time breach; *							
Method		Sample Date	E	ktraction / Preparation		Analysis				
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EP080/071: Total Recoverable Hydroca	arbons - NEPM 2013 Fractions									
Soil Glass Jar - Unpreserved (EP080)										
TRIP SPIKE,	TSC	12-Jun-2018	20-Jun-2018	26-Jun-2018	✓	22-Jun-2018	26-Jun-2018	✓		
Soil Glass Jar - Unpreserved (EP080) TRIP BLANK		14-Jun-2018	20-Jun-2018	28-Jun-2018	✓	22-Jun-2018	28-Jun-2018	1		
Soil Glass Jar - Unpreserved (EP071)										
TP13/C		18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	21-Jun-2018	30-Jul-2018	✓		
Soil Glass Jar - Unpreserved (EP080)										
TP13/C		18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	22-Jun-2018	02-Jul-2018	✓		
Soil Glass Jar - Unpreserved (EP080)										
BH1/A,	QA2,	18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	25-Jun-2018	02-Jul-2018	✓		
BH2/A,	QA1,									
TP3/A,	TP4/B,									
TP4/C,	TP5/B,									
TP6/A,	TP6/B,									
TP7/A,	TP8/A,									
TP8/B,	TP9/A,									
TP9/B,	TP10/B,									
TP11/C,	TP12/B,									
QA3,	BH13/B									
Soil Glass Jar - Unpreserved (EP071)										
BH1/A,	QA2,	18-Jun-2018	21-Jun-2018	02-Jul-2018	✓	25-Jun-2018	31-Jul-2018	✓		
BH2/A,	QA1,									
TP3/A,	TP4/B,									
TP4/C,	TP5/B,									
TP6/A,	TP6/B,									
TP7/A,	TP8/A,									
TP8/B,	TP9/A,									
TP9/B,	TP10/B,									
TP11/C,	TP12/B,									
QA3,	BH13/B									

Page : 7 of 10
Work Order : ES1817814

Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



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

Method		Sample Date	E	traction / Preparation		Analysis					
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation			
EP080: BTEXN											
Soil Glass Jar - Unpreserved (EP080)											
TRIP SPIKE,	TSC	12-Jun-2018	20-Jun-2018	26-Jun-2018	✓	22-Jun-2018	26-Jun-2018	✓			
Soil Glass Jar - Unpreserved (EP080)											
TRIP BLANK		14-Jun-2018	20-Jun-2018	28-Jun-2018	✓	22-Jun-2018	28-Jun-2018	✓			
Soil Glass Jar - Unpreserved (EP080)											
TP13/C		18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	22-Jun-2018	02-Jul-2018	✓			
Soil Glass Jar - Unpreserved (EP080)											
BH1/A,	QA2,	18-Jun-2018	20-Jun-2018	02-Jul-2018	✓	25-Jun-2018	02-Jul-2018	✓			
BH2/A,	QA1,										
TP3/A,	TP4/B,										
TP4/C,	TP5/B,										
TP6/A,	TP6/B,										
TP7/A,	TP8/A,										
TP8/B,	TP9/A,										
TP9/B,	TP10/B,										
TP11/C,	TP12/B,										
QA3,	BH13/B										

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



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.

	-					the special property of the sp	
Quality Control Sample Type			ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	31	12.90	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	4	33	12.12	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	5	38	13.16	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	31	12.90	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	31	12.90	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	4	33	12.12	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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Client : ROBERT CARR & ASSOCIATES P/L
Project : 13589 RACESCOURES RD, TERALBA



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
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines, version 2.1 June 2004. As received samples are tested for pH field and pH fox and assessed for a reaction rating.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (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 SnCl2 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 C / ASTM D7511. 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)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.
Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Drying only	EN020D	SOIL	In house

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Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge,
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202) In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
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 →

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☐ Perth: 10 Hod Way, Malaga WA 6090 Ph. 08 9209 7655 E. samples perth@alsenviro.com ☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	RCA Australia			JRNAROUND REQUIREMENTS: Standard TAT (List due date): FOR LABORATORY USE ONL										
OFFICE:	92 Hill Street, Carrington			AT may be longer for some tests	Standard or u	rgent TAT (List	t due da	te):			Custody			No 何
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ALS USE ONLY		Solid(S) Water(W)		CONTAINER INFORMATION	N	Where Me	atals ere re	quired, specify To	otal (unfiltered b	ottle required) or	Dissolved (field fil	tered bottle required).	Additional Infor	mation
						'S'			1	T			Comments on likely contamir	
-						METALS							dilutions, or samples requiring analysis etc.	g specific QC
							S 50g							
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	X, PAH,	ASBESTOS		<u></u>					
				(C/C/ TO GOGGG BOIOH)	BOTTELO	S-27 (TRH/BTEX, PHENOLS)	ASB		E N					
						TRH	Ē,		SCRE					
						S-27	CYANIDE,	ACM	ASS					
	BH1/a	18/06/2018	s			х	х							
2	QA2	18/06/2018	s			х	х	(
3	BH2/a	18/06/2018	s		a a	х	x						,	
4	QA1	18/06/2018	s			х	X						1.	
5	TP3/a	18/06/2018	s			х	х					Env Syd	ironmental Divis nev	ion
<u></u>	TP4/b	18/06/2018	s			х	Х					W	ork Order Reference	
7	TP4/c	18/06/2018	s			х	х						ES181781	4
8	TP4/3.3 ASS	18/06/2018	s						x					1111
9	TP5/b	18/06/2018	s			х	- X							
10	TP5/3.0 ASS 18/06/2018 S					х	X							
[]	TP6/a 18/06/2018 S						Х				Telepho	one: +61-2-8784 8555		
12	12 TP6/b 18/06/2018 S					х	х							<u>-</u>
				TOTAL	b								_	
Water Container Codes: P V = VOA Vial HCI Preserved Z = Zinc Acetale Preserved I	P = Unpreserved Plastic; N = Nifric Preser ; VB = VOA VIa! Sodium Bisulphate Prese Bottle; E = EDTA Preserved Bottles; ST = \$	ved Plastic; ORC = Nitric Present erved; VS = VOA Vial Sulfuric Pres Sterile Bottle; ASS = Plastic Rad	ved ORC; SH = Served; AV = Airfo	Sodium Hydroxide/Cd Preserved; S = Sodium Freight Unpreserved Vial SG = Sulfuric Preserve 1 Solls: B = Unpreserved Bag.	Hydroxide Prese ed Amber Glas	erved Plastic; AC s; H = HCl pres	G = Ambe served Pla	r Glass Unpres stic: HS = HC	erved; AP - Ai preserved Sp	rfreight Unpre eciation bottle	served Plastic SP = Sulfuric Pr	reserved Plastic; F = Fo	rmaldehyde Preserved Glass;	

ACM ASBORT



CHAIN OF CUSTODY

ALS Laboratory: please tick →

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CJ Perth: 10 Hod Way, Malage WA 6090 Ptr. 09 0209 7656 E: samples pesth@alsenviro.com CJ Launceston: 27 Wellington St, Launceston TAS 7250 Ptr. 03 631 2158 E: launceston@alsenviro.com

CLIENT:	RCA Australia			OUND REQUIREMENTS :	Standard TAT (I	FOI	FOR LABORATORY USE ONLY (Circle)								
OFFICE:	92 Hill Street, Carrington			AT may be longer for some tests ace Organics)	☐ Non Standard o	urgent TAT (List	t due da	ate):			Cus	lody SeaLi nfact	₩,	Yee No	QIA.
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ALS USE ONLY		LE DETAILS olid(S) Water(W)		CONTAINER INF	FORMATION	ł		UIRED includi	_					Additional Information	
LAB ID	SAMPLE ID DATE / TIME MATRIX		TYPE & PRESERVAT (refer to codes belou		PAH, 8 METALS,	CYANIDE, ASBESTOS 50g	ACM - a b estes	ASS SCREENING		ę			Comments on likely contaminant levels dilutions, or samples requiring specific tanalysis etc.		
13	TP7/a	18/06/2018	s			x	x						·		
14	TP7/a ACM	18/06/2018	s	<u> </u>				х							
15	TP8/a	18/06/2018	s			x	х								
16	TP8/0.5 ACM	18/06/2018	s					x				-			
17	TP8/a	18/06/2018	s			x	х								
18	TP9/a	18/06/2018	s			x	х								
19	TP9/0.5 ACM	18/06/2018	S		į.			х							
20	TP9/b	18/06/2018	S			x	х								
21	ТР10/Ь	18/06/2018 S				х	х								
22	TP11/c	18/06/2018	S			x	х			1					
23	TP12/b	TP12/b 18/06/2018 S				x	х								
24	QA3					x	x								

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; N = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Plastic; HS = HCl preserved Plastic; HS = HCl preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

TOTAL



CHAIN OF CUSTODY

ALS Laboratory: please tick →

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D Newcastle: 5 Rosegum Rd, Warebrook NSW 2304

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☐ Townsville: 14-15 Desma Ct, Bottle QLD 4818

☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
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(ALS)		· · · · ·	senviro.com PR:07 4796 U609 i		<u> </u>			890 Etadelard	efficie e e un	RO.COM			6331 2158 E: IBL																						
CLIENT:	RCA Australia			UND REQUIREMENTS :	☑ Standa	ard TAT (List	t due date):							FOR LABOR	ATORY USE	ONLY (CI	rcle)	,																	
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DATE (TIME			TYPE & PRESERVA	TIVE	TOTAL	PAH, 8 METALS,	170S 50g									ts on likely contam or samples requiri etc.																			

ALU OUL ONL	MATRIX: Solid(S) Water(W)						Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).					Additional information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	S-27 (TRHBTEX, PAH, 8 METALS, PHENOLS)	CYANIDE, ASBESTOS 50g	AGM	ASS SCREENING	тен/втех			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
25	BH13/b	18/06/2018	s			x	x						
26	TP13/c	18/06/2018	s			х	х						
27	TP13/c 2.0 ASS	18/06/2018	s						х				
28	TRIP BLANK	18/06/2018	s	14/6/2018		х	x					,	
29	TRIP SPIKE	18/06/2018	s	12/6/2018						х			
30	TSC	-		12/6/2018									
31	TP12/3.0	455	=	Ara									
	· · · · · · · · · · · · · · · · · · ·												
											*		
				,					-				
				TOTAL									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sodium Bisulphate Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Plastic; H = HCl preserved Plastic; HS = HCl preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



SAMPLE RECEIPT NOTIFICATION (SRN)

: ES1817814 Work Order

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : Environmental Division Sydney

Contact : DENTON MAULDIN Contact : Customer Services ES

Address : P O BOX 175 Address : 277-289 Woodpark Road Smithfield CARRINGTON NSW, AUSTRALIA 2294

NSW Australia 2164

E-mail E-mail : dentonm@rca.com.au : ALSEnviro.Sydney@alsglobal.com

Telephone Telephone : +61-2-8784 8555 Facsimile **Facsimile** : +61-2-8784 8500

Project : 13589 RACESCOURES RD. TERALBA Page · 1 of 4

Order number Quote number : ES2017ROBCAR0004 (SYBQ/400/17) C-O-C number QC Level : NEPM 2013 B3 & ALS QC Standard

Sampler : R.LAMONT

Dates

Date Samples Received : 19-Jun-2018 15:41 Issue Date : 19-Jun-2018 Scheduled Reporting Date Client Requested Due · 26-Jun-2018 26-Jun-2018

Date

Delivery Details

Security Seal Mode of Delivery Undefined : Not Available No of coolers/hoxes · 1 Temperature : 2.8 - Ice present

Receipt Detail No. of samples received / analysed · 31 / 30

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
- Sample TP12/3.0_ASS was received extra and placed on hold.
- 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).
- Asbestos analysis will be conducted by ALS Newcastle.
- ASS Scressing analysis will be conducted by ALS Brisbane.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- EA200: As only one sample container was submitted for multiple tests for all sample required Asbestos 50g, at the client's request, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly.

: 19-Jun-2018 Issue Date

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Client : ROBERT CARR & ASSOCIATES P/L



Sample Container(s)/Preservation Non-Compliances

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

lethod Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
sbestos Identification in Soils :	·	. Total de Campio de Manier les vinanços
BH1/A	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
QA2	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
BH2/A	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
QA1	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP3/A	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP4/B	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP4/C	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP5/B	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP6/A	 Snap Lock Bag - Subsampled by 	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP6/B	 Snap Lock Bag - Subsampled by 	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP7/A	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP8/A	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP8/B	 Snap Lock Bag - Subsampled by 	 Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP9/A	 Snap Lock Bag - Subsampled by 	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP9/B	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP10/B	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP11/C	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP12/B	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
QA3	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
DII40/D	ALS	Bag
BH13/B	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	Bag
TP13/C	- Snap Lock Bag - Subsampled by	- Snap Lock Bag - ACM/Asbestos Grab
	ALS	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.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

: 19-Jun-2018 Issue Date

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Client : ROBERT CARR & ASSOCIATES P/L



Matrix: SOIL Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EK026SF (Solids) Total Cyanide By Segmented Flow Analyser	SOIL - S-18 (NO MOIST) TRH(C6-C9)/BTEXN with No Moisture for TBs	SOIL - S-27 TRH/BTEXN/PAH/Phenols/8Metals
ES1817814-001	18-Jun-2018 00:00	BH1/A			✓	✓	✓		✓
ES1817814-002	18-Jun-2018 00:00	QA2			✓	✓	✓		✓
ES1817814-003	18-Jun-2018 00:00	BH2/A			✓	✓	✓		✓
ES1817814-004	18-Jun-2018 00:00	QA1			✓	✓	✓		✓
ES1817814-005	18-Jun-2018 00:00	TP3/A			✓	✓	✓		✓
ES1817814-006	18-Jun-2018 00:00	TP4/B			✓	✓	✓		✓
ES1817814-007	18-Jun-2018 00:00	TP4/C			✓	✓	✓		✓
ES1817814-008	18-Jun-2018 00:00	TP4/3.3 ASS		✓					
ES1817814-009	18-Jun-2018 00:00	TP5/B			✓	✓	✓		✓
ES1817814-010	18-Jun-2018 00:00	TP5/3.0 ASS		✓					
ES1817814-011	18-Jun-2018 00:00	TP6/A			✓	✓	✓		✓
ES1817814-012	18-Jun-2018 00:00	TP6/B			✓	✓	✓		✓
ES1817814-013	18-Jun-2018 00:00	TP7/A			✓	✓	✓		✓
ES1817814-014	18-Jun-2018 00:00	TP7/A ACM				✓			
ES1817814-015	18-Jun-2018 00:00	TP8/A			✓	✓	✓		✓
ES1817814-016	18-Jun-2018 00:00	TP8/0.5 ACM				✓			
ES1817814-017	18-Jun-2018 00:00	TP8/B			✓	✓	✓		✓
ES1817814-018	18-Jun-2018 00:00	TP9/A			✓	✓	✓		✓
ES1817814-019	18-Jun-2018 00:00	TP9/0.5 ACM				✓			
ES1817814-020	18-Jun-2018 00:00	TP9/B			✓	✓	✓		✓
ES1817814-021	18-Jun-2018 00:00	TP10/B			✓	✓	✓		✓
ES1817814-022	18-Jun-2018 00:00	TP11/C			✓	✓	✓		✓
ES1817814-023	18-Jun-2018 00:00	TP12/B			✓	✓	✓		✓
ES1817814-024	18-Jun-2018 00:00	QA3			✓	✓	✓		✓
ES1817814-025	18-Jun-2018 00:00	BH13/B			✓	✓	✓		✓
ES1817814-026	18-Jun-2018 00:00	TP13/C			✓	✓	✓		✓
ES1817814-027	18-Jun-2018 00:00	TP13/C 2.0 ASS		✓					
ES1817814-028	14-Jun-2018 00:00	TRIP BLANK						✓	
ES1817814-029	12-Jun-2018 00:00	TRIP SPIKE						✓	
ES1817814-030	12-Jun-2018 00:00	TSC						✓	
ES1817814-031	18-Jun-2018 00:00	TP12/3.0-ASS	✓						

Proactive Holding Time Report

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

: 19-Jun-2018 Issue Date

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Client ROBERT CARR & ASSOCIATES P/L



Requested Deliverables

ALL INVOICES

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

DENTON MAULDIN

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

Richie Lamont

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



CERTIFICATE OF ANALYSIS

Work Order : ES1818864

Client : ROBERT CARR & ASSOCIATES P/L

Contact : MS FIONA BROOKER

Address : P O BOX 175

CARRINGTON NSW. AUSTRALIA 2294

Telephone : +61 02 4902 9200

: 13589 **Project**

Order number

C-O-C number

Sampler : ZAC LAUGHLAN

Site

Quote number : SYBQ/400/17

No. of samples received : 6 No. of samples analysed : 6 Page : 1 of 7

Date Samples Received

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

: 27-Jun-2018 15:50

Telephone : +61-2-8784 8555

Date Analysis Commenced : 29-Jun-2018

Issue Date : 03-Jul-2018 15:07



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with **Quality Review and Sample Receipt Notification.**

Signatories

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

Signatories Position Accreditation Category

Edwandy Fadjar Organic Coordinator Sydney Organics, Smithfield, NSW Ivan Taylor Sydney Inorganics, Smithfield, NSW Analyst

Page : 2 of 7 Work Order : ES1818864

Client : ROBERT CARR & ASSOCIATES P/L

Project : 13589

ALS

General Comments

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

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

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

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

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

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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

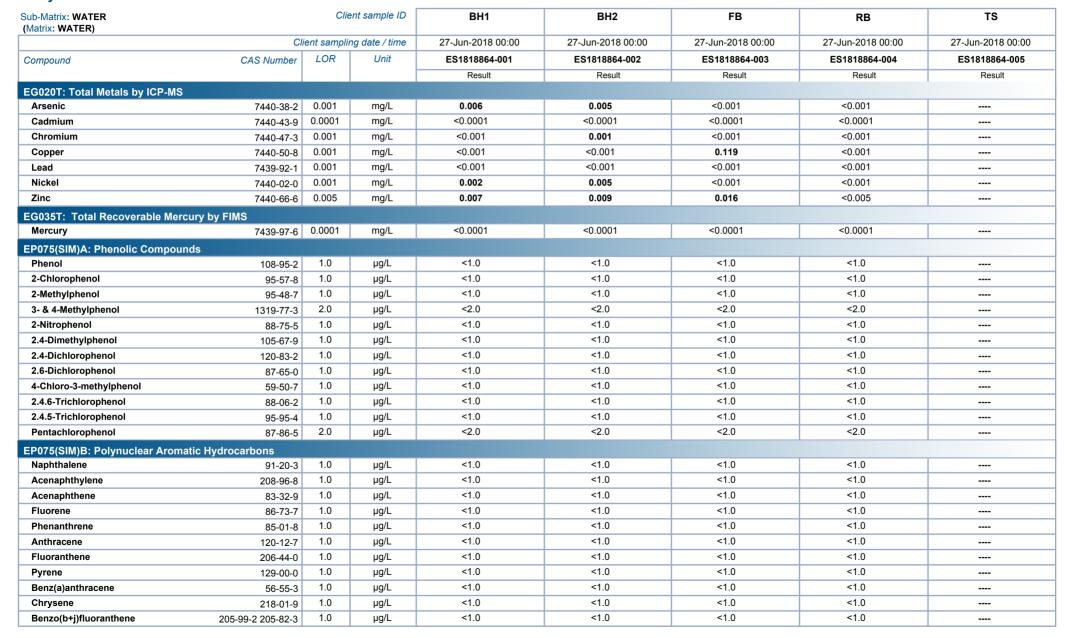
LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- EG020 : Positive results for sample ES1818864-003 has been confirmed by re-digestion and reanalysis.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- 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.

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 13589

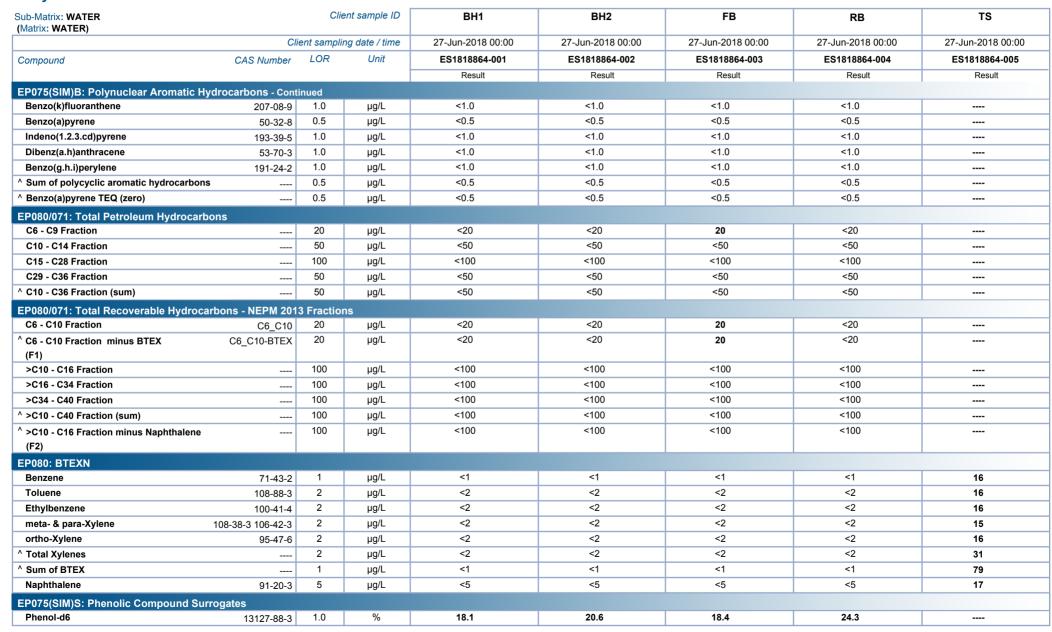




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Client : ROBERT CARR & ASSOCIATES P/L

Project : 13589

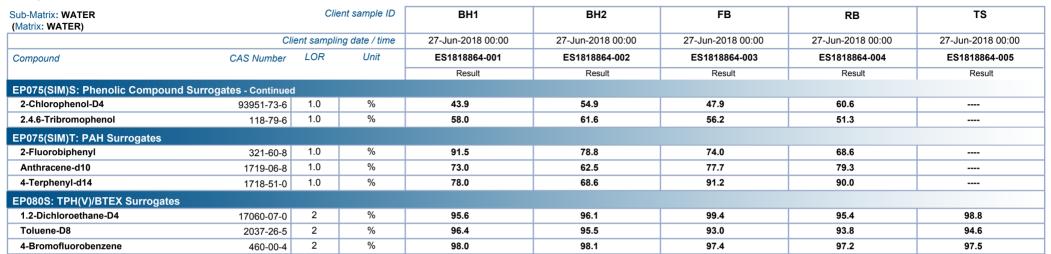




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Client : ROBERT CARR & ASSOCIATES P/L

Project : 13589





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Client : ROBERT CARR & ASSOCIATES P/L

Project : 13589



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			ТВ					
	ent sampli	ng date / time	27-Jun-2018 00:00						
Compound	CAS Number	LOR	Unit	ES1818864-006					
				Result					
EP080/071: Total Petroleum Hydro	carbons								
C6 - C9 Fraction		20	μg/L	<20					
EP080/071: Total Recoverable Hyd	EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	μg/L	<20					
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	μg/L	<20					
(F1)									
EP080: BTEXN									
Benzene	71-43-2	1	μg/L	<1					
Toluene	108-88-3	2	μg/L	<2					
Ethylbenzene	100-41-4	2	μg/L	<2					
meta- & para-Xylene	108-38-3 106-42-3	2	μg/L	<2					
ortho-Xylene	95-47-6	2	μg/L	<2					
^ Total Xylenes		2	μg/L	<2					
^ Sum of BTEX		1	μg/L	<1					
Naphthalene	91-20-3	5	μg/L	<5					
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%	97.7					
Toluene-D8	2037-26-5	2	%	96.4					
4-Bromofluorobenzene	460-00-4	2	%	100.0					

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 Work Order
 : ES1818864

Client : ROBERT CARR & ASSOCIATES P/L

Project : 1358

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)				
Compound	CAS Number	Low	High			
EP075(SIM)S: Phenolic Compound Surrogates						
Phenol-d6	13127-88-3	10	44			
2-Chlorophenol-D4	93951-73-6	14	94			
2.4.6-Tribromophenol	118-79-6	17	125			
EP075(SIM)T: PAH Surrogates						
2-Fluorobiphenyl	321-60-8	20	104			
Anthracene-d10	1719-06-8	27	113			
4-Terphenyl-d14	1718-51-0	32	112			
EP080S: TPH(V)/BTEX Surrogates						
1.2-Dichloroethane-D4	17060-07-0	71	137			
Toluene-D8	2037-26-5	79	131			
4-Bromofluorobenzene	460-00-4	70	128			





QUALITY CONTROL REPORT

Work Order : ES1818864

Client : ROBERT CARR & ASSOCIATES P/L

Contact : MS FIONA BROOKER

Address : P O BOX 175

CARRINGTON NSW, AUSTRALIA 2294

Telephone : +61 02 4902 9200

Project : 13589

Order number :

C-O-C number : ---

Sampler : ZAC LAUGHLAN

Site · ---

Quote number : SYBQ/400/17

No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 6

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 27-Jun-2018

Date Analysis Commenced : 29-Jun-2018

Issue Date : 03-Jul-2018



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

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

Signatories

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

Signatories Position Accreditation Category

Edwandy Fadjar Organic Coordinator Sydney Organics, Smithfield, NSW Ivan Taylor Analyst Sydney Inorganics, Smithfield, NSW

Page : 2 of 6 Work Order : ES1818864

Client : ROBERT CARR & ASSOCIATES P/L

Project : 13589



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		Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Meta	s by ICP-MS (QC Lot:	: 1764179)							
ES1818816-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
ES1818816-013	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.003	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EG035T: Total Rec	overable Mercury by F	IMS (QC Lot: 1761716)							
ES1818863-004	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1818910-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP080/071: Total Pe	troleum Hydrocarbon	s (QC Lot: 1762245)							
ES1818762-001	Anonymous	EP080: C6 - C9 Fraction		20	μg/L	120	120	0.00	No Limit
ES1818815-001	Anonymous	EP080: C6 - C9 Fraction		20	μg/L	<20	<20	0.00	No Limit
EP080/071: Total Re	coverable Hydrocarbo	ons - NEPM 2013 Fractions (QC Lot: 1762245)							
ES1818762-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	μg/L	130	130	0.00	No Limit
ES1818815-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	μg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1762245)									

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 13589



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: 1762245) - continu	ıed							
ES1818762-001	Anonymous	EP080: Benzene	71-43-2	1	μg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	μg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	μg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	μg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	μg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	μg/L	8	8	0.00	No Limit
ES1818815-001	Anonymous	EP080: Benzene	71-43-2	1	μg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	μg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	μg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	μg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	μg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	μg/L	<5	<5	0.00	No Limit

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Client : ROBERT CARR & ASSOCIATES P/L

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

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

Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1764179)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	91.9	82	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	91.7	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.4	86	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.4	83	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.8	85	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.1	84	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.6	79	117
EG035T: Total Recoverable Mercury by FIMS (QCL	.ot: 1761716)							
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.2	77	111
EP075(SIM)A: Phenolic Compounds (QCLot: 17610	57)							
EP075(SIM): Phenol	108-95-2	1	μg/L	<1.0	5 μg/L	33.7	25	62
EP075(SIM): 2-Chlorophenol	95-57-8	1	μg/L	<1.0	5 μg/L	69.8	52	90
EP075(SIM): 2-Methylphenol	95-48-7	1	μg/L	<1.0	5 μg/L	68.4	51	91
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	μg/L	<2.0	10 μg/L	64.0	44	88
EP075(SIM): 2-Nitrophenol	88-75-5	1	μg/L	<1.0	5 μg/L	65.2	48	100
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	μg/L	<1.0	5 μg/L	71.9	49	99
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	μg/L	<1.0	5 μg/L	71.3	53	105
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	μg/L	<1.0	5 μg/L	75.0	57	105
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	μg/L	<1.0	5 μg/L	71.1	53	99
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	μg/L	<1.0	5 μg/L	72.2	50	106
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	μg/L	<1.0	5 μg/L	70.8	51	105
EP075(SIM): Pentachlorophenol	87-86-5	2	μg/L	<2.0	10 μg/L	37.1	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	(QCLot: 1761057)							
EP075(SIM): Naphthalene	91-20-3	1	μg/L	<1.0	5 μg/L	76.3	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	μg/L	<1.0	5 μg/L	75.9	64	114
EP075(SIM): Acenaphthene	83-32-9	1	μg/L	<1.0	5 μg/L	76.4	62	113
EP075(SIM): Fluorene	86-73-7	1	μg/L	<1.0	5 μg/L	79.2	64	115
EP075(SIM): Phenanthrene	85-01-8	1	μg/L	<1.0	5 μg/L	87.8	63	116
EP075(SIM): Anthracene	120-12-7	1	μg/L	<1.0	5 μg/L	68.8	64	116
EP075(SIM): Fluoranthene	206-44-0	1	μg/L	<1.0	5 μg/L	80.3	64	118
EP075(SIM): Pyrene	129-00-0	1	μg/L	<1.0	5 μg/L	80.6	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	μg/L	<1.0	5 μg/L	88.6	64	117
EP075(SIM): Chrysene	218-01-9	1	μg/L	<1.0	5 μg/L	82.6	63	116

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Project : 13589



Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LCS	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLo	:: 1761057) <i>-</i> coi	ntinued						
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	μg/L	<1.0	5 μg/L	88.3	62	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	μg/L	<1.0	5 μg/L	91.8	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	μg/L	<0.5	5 μg/L	88.5	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	μg/L	<1.0	5 μg/L	79.0	60	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	μg/L	<1.0	5 μg/L	72.6	61	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	μg/L	<1.0	5 μg/L	71.3	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 176105	i6)							
EP071: C10 - C14 Fraction		50	μg/L	<50	2000 μg/L	86.7	76	116
EP071: C15 - C28 Fraction		100	μg/L	<100	3000 μg/L	103	83	109
EP071: C29 - C36 Fraction		50	μg/L	<50	2000 μg/L	81.0	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 176224	ļ 5)							
EP080: C6 - C9 Fraction		20	μg/L	<20	260 μg/L	80.4	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013	Fractions (QCL	ot: 1761056)						
EP071: >C10 - C16 Fraction		100	μg/L	<100	2500 μg/L	92.7	76	114
EP071: >C16 - C34 Fraction		100	μg/L	<100	3500 μg/L	92.8	81	111
EP071: >C34 - C40 Fraction		100	μg/L	<100	1500 μg/L	108	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013	Fractions (QCL	ot: 1762245)						
EP080: C6 - C10 Fraction	C6_C10	20	μg/L	<20	310 μg/L	80.1	75	127
EP080: BTEXN (QCLot: 1762245)								
EP080: Benzene	71-43-2	1	μg/L	<1	10 μg/L	76.4	70	122
EP080: Toluene	108-88-3	2	μg/L	<2	10 μg/L	81.2	69	123
EP080: Ethylbenzene	100-41-4	2	μg/L	<2	10 μg/L	80.4	70	120
EP080: meta- & para-Xylene	108-38-3	2	μg/L	<2	10 μg/L	80.0	69	121
1 7	106-42-3							
EP080: ortho-Xylene	95-47-6	2	μg/L	<2	10 μg/L	82.2	72	122
EP080: Naphthalene	91-20-3	5	μg/L	<5	10 μg/L	91.5	70	120

Matrix Spike (MS) Report

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

Sub-Matrix: WATER		Matrix Spike (MS) Report					
				Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Met	als by ICP-MS (QCLot: 1764179)						
ES1818816-004	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	102	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	97.2	70	130

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Project : 13589



Sub-Matrix: WATER		Ma	trix Spike (MS) Repor	t					
				Spike	SpikeRecovery(%)	Recovery Li	mits (%)		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
EG020T: Total Met	als by ICP-MS (QCLot: 1764179) - continued								
ES1818816-004	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	94.4	70	130		
		EG020A-T: Copper	7440-50-8	1 mg/L	99.4	70	130		
		EG020A-T: Lead	7439-92-1	1 mg/L	99.0	70	130		
		EG020A-T: Nickel	7440-02-0	1 mg/L	98.2	70	130		
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.9	70	130		
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1761716)									
ES1818863-003	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	93.7	70	130		
EP080/071: Total P	etroleum Hydrocarbons (QCLot: 1762245)								
ES1818762-001	Anonymous	EP080: C6 - C9 Fraction		325 μg/L	101	70	130		
EP080/071: Total R	ecoverable Hydrocarbons - NEPM 2013 Fractions (QCL	ot: 1762245)							
ES1818762-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 μg/L	102	70	130		
EP080: BTEXN (Q	CLot: 1762245)								
ES1818762-001	Anonymous	EP080: Benzene	71-43-2	25 μg/L	90.2	70	130		
		EP080: Toluene	108-88-3	25 μg/L	92.4	70	130		
		EP080: Ethylbenzene	100-41-4	25 μg/L	95.2	70	130		
		EP080: meta- & para-Xylene	108-38-3	25 μg/L	92.0	70	130		
			106-42-3						
		EP080: ortho-Xylene	95-47-6	25 μg/L	95.8	70	130		
		EP080: Naphthalene	91-20-3	25 μg/L	93.0	70	130		



QA/QC Compliance Assessment to assist with Quality Review

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Client : ROBERT CARR & ASSOCIATES P/L Laboratory : Environmental Division Sydney

 Contact
 : MS FIONA BROOKER
 Telephone
 : +61-2-8784 8555

 Project
 : 13589
 Date Samples Received
 : 27-Jun-2018

 Site
 : --- Issue Date
 : 03-Jul-2018

Sampler : ZAC LAUGHLAN 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.
- NO Matrix Spike outliers occur.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

NO Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

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

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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	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	8	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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

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

Holding times for <u>VOC in soils</u> 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 <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER

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

Matrix: WATER						Evaluation	: × = Holding time	breach; ✓ = Withii	n holding time
Method		Samp	ple Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)				Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS									
Clear Plastic Bottle - Nitric Acid; Unfiltered (E	G020A-T)								
BH1,	BH2,	27-Ju	ın-2018	29-Jun-2018	24-Dec-2018	✓	29-Jun-2018	24-Dec-2018	✓
FB,	RB								
EG035T: Total Recoverable Mercury by FIMS	s								
Clear Plastic Bottle - Nitric Acid; Unfiltered (E	G035T)								
BH1,	BH2,	27-Ju	ın-2018				29-Jun-2018	25-Jul-2018	✓
FB,	RB								
EP075(SIM)A: Phenolic Compounds									
Amber Glass Bottle - Unpreserved (EP075(SII	M))								
BH1,	BH2,	27-Ju	ın-2018	29-Jun-2018	04-Jul-2018	✓	02-Jul-2018	08-Aug-2018	✓
FB,	RB								
EP075(SIM)B: Polynuclear Aromatic Hydroca	arbons								
Amber Glass Bottle - Unpreserved (EP075(SII	M))								
BH1,	BH2,	27-Ju	ın-2018	29-Jun-2018	04-Jul-2018	✓	02-Jul-2018	08-Aug-2018	✓
FB,	RB								

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Matrix: WATER					Evaluation	: × = Holding time	breach ; ✓ = Within	n holding time.
Method		Sample Date	Ex	traction / 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)								
BH1,	BH2,	27-Jun-2018	29-Jun-2018	04-Jul-2018	✓	02-Jul-2018	08-Aug-2018	\checkmark
FB,	RB							
Amber VOC Vial - Sulfuric Acid (EP080)								
BH1,	BH2,	27-Jun-2018	29-Jun-2018	11-Jul-2018	✓	29-Jun-2018	11-Jul-2018	\checkmark
FB,	RB,							
ТВ								
EP080/071: Total Recoverable Hydrocarbons	- NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)								
BH1,	BH2,	27-Jun-2018	29-Jun-2018	04-Jul-2018	✓	02-Jul-2018	08-Aug-2018	✓
FB,	RB							
Amber VOC Vial - Sulfuric Acid (EP080)								
BH1,	BH2,	27-Jun-2018	29-Jun-2018	11-Jul-2018	✓	29-Jun-2018	11-Jul-2018	✓
FB,	RB,							
ТВ								
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
BH1,	BH2,	27-Jun-2018	29-Jun-2018	11-Jul-2018	1	29-Jun-2018	11-Jul-2018	✓
FB,	RB,							
TS,	ТВ							

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Project : 13589



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: x = Quality Control frequency not within specification: √ = Quality Control frequency within specification.

Matrix: WATER		Evaluation: * = Quality Control frequency not within specification; * = Quality Control frequency within					
Quality Control Sample Type		С	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	0.00	10.00	. ≰	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	18	0.00	10.00	.sc	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)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	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)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	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)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	0.00	5.00	x	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	√	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	18	0.00	5.00	.	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	<u>√</u>	NEPM 2013 B3 & ALS QC Standard

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 1358



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
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 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)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to 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)
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

ALS

CHAIN OF CUSTODY

ALS Laboratory: please tick ->

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☐ Launceston: 27 Wellington St. Launceston TAS 7250
Ph: 03 6331 2158 F: launceston@alsenviro.com

					_		9		The state of the Control of the state of the	@ alocituto com			
CLIENT:	RCA Australia		1	ROUND REQUIREMENTS: Standard TAT (List due date): TAT may be longer for some leste.									
OFFICE:	92 Hill Street, Carrington		(Standard TAT e.g., Ultra Tra	T may be longer for some tests ce Organics)	☐ Non Standard or	urgent TAT (List	due date):		Gu <u>stady</u> Seal Intect?	Yes No Nile kx neasont upon No Nile			
RCA Ref No:	13589		ALS QUOT	E NO.: SY	/BQ_400_17		COC SEQUENCE NUMBER (Circle) (Circle) (Circle) (Circle) (Circle) (Circle) (Circle) (Circle) (Circle) (Circle) (Circle)						
							coc: 1 2	3 4 5	7 Rauton Sample Tempe	Fettire on Receipt: 6.9			
PROJECT MANAGER:			PH: 0408 687		T==:	···	OF: 1 2	3 4 5 (
SAMPLER: Zac Laugh COC Emailed to ALS?			MOBILE: 0428		RELINQUISHED BY	ur Laureld	DATE/TIME: 27/6/18		RELINQUISHED BY:	RECEIVED BY:			
	inistrator@rca.com.au + zacharyl@		MAT (or defaul	t):	DATE/TIME:	a cang	DATE/TIME		DATE/TIME:	A			
Email Invoice to: as at		rea.com.au · nonab@rea.com	.au		27/6/18	3:4900	37/6/18	15:50	DATE/TIME:	DATE/TIME: 27/6/18 19:50			
	HANDLING/STORAGE OR DISPO	SAL:			1 2 1/0/10			13.30		27/8/10 (-1. 2			
ALS USE ONLY		PLE DETAILS Solid(S) Water(W)		CONTAINER IN	FORMATION				Codes must be listed to attract suite or Dissolved (field filtered bottle require	Additional Information			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVA' (refer to codes belo		TRH, BTEXU, PAH Phends. M. 8- W. 27		E-M	AB OF ORIGIN: NEWCASTLE	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.			
1	BH1	27/6/18	Water		1				MEAN				
2	BH2	1/2/0	1		4.								

3	FB				4								
4	RB				1				}	Environmental Division			
S	TS				1					Sydney Work Order Reference			
	TP	1								ES1818864 -			
<u> </u>	TB	Ψ	₩		/_								
										1 elephone : ± 61-2-8784 8565			
							ł						
Water Container Code	P. T. Hoppes enved Digeties N Militin Connection	pred Plactics ORC - Miles Person	M OBC - SH - S	office Hudovide (C.) Pares	TOTAL /8								
rajer comanier codes: 1	P = Unpreserved Plastic; N = Nitric Preser	ved master, ONG - Nitro Preserve	ou ONO, 3H = 50	odium mydroxide/Cd Preserved;	o - Soulum Hydroxide Pre	served Mastic; AG	= Ainber Glass Unpreserved	i; AP - Airtreight Unpr	eserved Plastic				

Water Container Codes: P = Onlineserved Plastic; N = Nitrit Preserved Plastic; N = Suffuric Preserved Plastic; N = Nitrit Plastic



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1818864

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : Environmental Division Sydney

Contact : MS FIONA BROOKER Contact : Customer Services ES

Address : P O BOX 175 Address : 277-289 Woodpark Road Smithfield

NSW Australia 2164

Telephone : +61 02 4902 9200 Telephone : +61-2-8784 8555
Facsimile : +61 02 4902 9299 Facsimile : +61-2-8784 8500

Project : 13589 Page : 1 of 2

CARRINGTON NSW, AUSTRALIA 2294

 Order number
 :
 Quote number
 : ES2017ROBCAR0004 (SYBQ/400/17)

 C-O-C number
 : --- QC Level
 : NEPM 2013 B3 & ALS QC Standard

Site : ----

Sampler : ZAC LAUGHLAN

Dates

Date

Delivery Details

Mode of Delivery: UndefinedSecurity Seal: Not AvailableNo. of coolers/boxes: 1Temperature: 6.9 - 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 (3 weeks), Solid (2 months) from receipt of samples.

Issue Date : 27-Jun-2018

Page

: 2 of 2 : ES1818864 Amendment 0 Work Order

Client : ROBERT CARR & ASSOCIATES P/L



Sample Container(s)/Preservation Non-Compliances

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

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

process necessar tasks. Packages as the determin tasks, that are incl If no sampling default 00:00 on is provided, the	may contain ad ation of moisture uded in the package. time is provided, the date of samplin		WATER - EP080 BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN	WATER - W-27T TRH/BTEXN/PAH/Phenols/Total 8 Metals
ES1818864-001	27-Jun-2018 00:00	BH1	<u>> m</u>	> F	<u>></u>
E31010004-001	21-Jun-2016 00.00	БП			V
ES1818864-002	27-Jun-2018 00:00	BH2			✓
ES1818864-003	27-Jun-2018 00:00	FB			✓
ES1818864-004	27-Jun-2018 00:00	RB			✓
ES1818864-005	27-Jun-2018 00:00	TS	✓		
ES1818864-006					

Proactive Holding Time Report

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

Requested Deliverables

ALL INVOICES

ALL INVOICES		
 *AU Certificate of Analysis - NATA (COA) 	Email	administrator@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	administrator@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	administrator@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	administrator@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au
- Chain of Custody (CoC) (COC)	Email	administrator@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	administrator@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	administrator@rca.com.au
FIONA BROOKER		
 *AU Certificate of Analysis - NATA (COA) 	Email	fionab@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	fionab@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	fionab@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	fionab@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	fionab@rca.com.au
- Chain of Custody (CoC) (COC)	Email	fionab@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	fionab@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	fionab@rca.com.au
ZAC LAUGHLAN		
 *AU Certificate of Analysis - NATA (COA) 	Email	zacharyl@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	zacharyl@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	zacharyl@rca.com.au
 A4 - AU Sample Receipt Notification - Environmental HT (SRN) 	Email	zacharyl@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	zacharyl@rca.com.au
- Chain of Custody (CoC) (COC)	Email	zacharyl@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	zacharyl@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	zacharyl@rca.com.au

Appendix H

Summary of Results

Sample Identification				Gu	ideline ^A			BH1/A	BH2/A	TP3/A	TP4/B	TP4/C	TP5/B	TP6/A	TP6/B	TP7/A	TP8/A	TP8/B
Sample Depth (m) B	PQL		HSL 'D'		ESL C&I	n-sensitive		0.1	0.1	0.5	1.0	2.0	0.5	0.5	1.0	0.5	0.5	1.0
Date	I QL	SAND 0-<1m	SAND 1-<2m	SAND 2-<4m	Coarse	Coarse	DC D	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18
						Sample Pro		Sandy Clay fill, brown with some sandstone and igneous gravel	Clayey Sand fill, brown with some igneous gravel	Clayey Sand fill, brown with metal, brick, concrete, sandstone and timber	Sandy Clay fill, brown with metal, brick, concrete and igneous gravel	Sandy Clay fill, grey with some brick and concrete	Clayey Sand fill, brown with brick, concrete and some metal	Sandey Clay fill, brown with terracotta pipe, some concrete and brick	Sandy Clay fill, bown and pale brown with concrete, metal, brick and plastic	Clayey Sand fill, brown with some concret, brick plastic pipe, trace metal	Sandy Clay fill, brown with concrete, brick and some metal	brown with
					Domin	ant Stratur	n ^C	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
					Sa	mple Purpo	se	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
					Sampl	e collected	by	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Benzene, Toluene, Ethyll	benzen	ne, Xylene	e (BTEX)															
Benzene	0.2	3	3	3	75		430	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5	NL	NL	NL	135		99000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	NL	NL	NL	165		27000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- and para-Xylene	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	1	230	NL	NL	180		81000	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Polycyclic Aromatic Hyd	rocarb																	
Naphthalene	1	NL	NL	NL	370		11000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydro	1	ns (TRH)			1	·		T				T	T	T			r	
TRH C ₆ -C ₁₀	10					700	26000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRH > C_{10} - C_{16}	50				170	1000	20000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	100				1700	3500	27000	<100	380 [*]	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	100				3300	10000	38000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F1	10	260	370	630	215			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2	50	NL	NL	NL				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

All results are in units of mg/kg.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

F1 = TRH C_6 - C_{10} minus BTEX. F1 PQL deemed equal TRH C_6 - C_{10} .

NL designates 'Not Limiting' indicating that the pore water concentration required to constitute a vapour risk is higher than the solubility capacity for that compound based on a petroleum mixture. Vapour is therefore not a risk for this compound.

Results for TRH have been compared to TPH guidelines.

Presented ESL for naphthalene is an Ecological Investigation Level

For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero

Results shown in BOLD are in excess of the vapour based HSL

Results shown in shading are >250% of the vapour based HSL

Results shown in underline are in excess of the ESL

Results shown in italics are in excess of the management limit

Results shown in patterned cells are in excess of the direct contact HSL

Where summation required (Xylene, F1) calculation includes components reported as non detected as 1/2 PQL.

Concrush Pty Ltd Contamination Assessment Racecourse Rd. Teralba

RCA ref:13589-401/3, November 2018

Prepared by: RJL Checked by: FB RCA Australia. AWS-TEM-018/15

^A ASC NEPM 1999 (amended April 2013) Vapour Based Health Screening Levels (HSL) 'D' (Commercial/Industrial)

^A ASC NEPM 1999 (amended April 2013) Ecological Screening Levels (ESL) C&I (Commercial and Industrial)

A ASC NEPM 1999 (amended April 2013) Management Limits (ML) Non-Sensitive Sites (Commercial and Industrial)

^A CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Level 'D' (Commercial/Industrial)

^B Start of sample, over a 0.1m interval

^C Note that this is a generalisation for the purpose of comparing to the HSL criteria. Where two strata equally represented, most conservative criterion used

^{*} Duplicate sample value used where RPD result exceeds 30% and duplicate sample value is greater than test sample value

Sample Identification				Gu	ideline ^A			TP9/A	TP9/B	TP10/B	TP11/C	TP12/B	BH13/B	TP13/C
Sample Depth (m) B	PQL		HSL 'D'			n-sensitive		0.5	1.0	1.0	2.0	1.0	1.0	2.0
Date	FQL	SAND 0-<1m	SAND 1-<2m	SAND 2-<4m	Coarse	Coarse	DC D	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18
						Sample Pro		Sandy Clay fill, brown with concrete, brick, metal, igneous gravel, some plastic and tyre	Sandy Clay fill, brown with concrete, brick, metal, igneous gravel, some plastic and tyre	Sandy Clay fill, brown with timber, some concrete, tile, plastic, igneous and sandstone gravel and tyre	Sandy Clay fill,m brown mottled green with some igneous gravel, concrete, brick, trace cloth and metal	Sandy Clay fill, brown and pale brown with tree stump, brick, concrete, some metal	Sandy Clay fill, dark brown with some igneous gravel	Sandy Clay, grey mottled pale brown
						nant Stratun		Sand	Sand	Sand	Sand	Sand	Sand	Sand
						mple Purpo		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
					Samp	le collected	by	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Benzene, Toluene, Ethyl	benzer	ne, Xylen	e (BTEX)											
Benzene	0.2	3	3	3	75		430	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5	NL	NL	NL	135		99000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	NL	NL	NL	165		27000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- and para-Xylene	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	0.5							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	1	230	NL	NL	180		81000	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Polycyclic Aromatic Hyd	rocarb	ons (PAF	l)											
Naphthalene	1	NL	NL	NL	370		11000	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydro	carbo	ns (TRH)												
TRH C ₆ -C ₁₀	10					700	26000	<10	<10	<10	<10	<10	<10	<10
TRH >C ₁₀ -C ₁₆	50				170	1000	20000	<50	<50	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	100				1700	3500	27000	<100	<100	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	100				3300	10000	38000	<100	<100	<100	<100	<100	<100	<100
F1	10	260	370	630	215			<10	<10	<10	<10	<10	<10	<10
F2	50	NL	NL	NL				<50	<50	<50	<50	<50	<50	<50

All results are in units of mg/kg.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

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Results shown in patterned cells are in excess of the direct contact HSL

Where summation required (Xylene, F1) calculation includes components reported as non detected as 1/2 PQL.

^A ASC NEPM 1999 (amended April 2013) Vapour Based Health Screening Levels (HSL) 'D' (Commercial/Industrial)

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^B Start of sample, over a 0.1m interval

^C Note that this is a generalisation for the purpose of comparing to the HSL criteria. Where two strata equally represented, most conservative criterion used

^{*} Duplicate sample value used where RPD result exceeds 30% and duplicate sample value is greater than test sample value

Sample Identification		Guid	leline ^A	BH1/A	BH2/A	TP3/A	TP4/B	TP4/C	TP5/B	TP6/A	TP6/B	TP7/A	TP7/A ACM	TP8/A	TP8/0.5 ACM	TP8/B	TP9/A	TP9/0.5 ACM
Sample Depth (m) B	PQL	HIL 'D'	EIL C&I	0.1	0.1	0.5	1.0	2.0	0.5	0.5	1.0	0.5	0.5	0.5	0.5	1.0	0.5	0.5
Date		HIL D	EIL CAI	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18
		mple Profi		Sandy Clay fill, brown with some sandstone and igneous gravel	Clayey Sand fill, brown with some igneous gravel	Clayey Sand fill, brown with metal, brick, concrete, sandstone and timber	Sandy Clay fill, brown with metal, brick, concrete and igneous gravel	Sandy Clay fill, grey with some brick and concrete	Clayey Sand fill, brown with brick, concrete and some metal	Sandey Clay fill, brown with terracotta pipe, some concrete and brick	Sandy Clay fill, bown and pale brown with concrete, metal, brick and plastic	Clayey Sand fill, brown with some concret, brick plastic pipe, trace metal	Fragment	Sandy Clay fill, brown with concrete, brick and some metal	Fragment	Sandy Clay fill, brown with concrete, brick and some metal	Sandy Clay fill, brown with concrete, brick, metal, igneous gravel, some plastic and tyre	Fragment
		ple Purpos collected b		Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
			Ју	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Polycyclic Aromatic Hydrocarbon)		T			1			ı	T.	1 1			T	T		
Naphthalene	0.5		370	0.25	3.2 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Acenaphthylene	0.5			0.25	0.8 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Acenaphthene	0.5			0.25	3.2 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Fluorene	0.5			0.25	4.7 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Phenanthrene	0.5			0.25	40.6 ^c	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Anthracene	0.5			0.25	9.2 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Fluoranthene	0.5			0.8 ^c	37.4 ^c	0.6	<0.5	<0.5	1.4	0.7	<0.5	<0.5		<0.5		<0.5	<0.5	
Pyrene	0.5			0.8 ^c	32.9 ^c	0.5	<0.5	<0.5	1.2	0.8	<0.5	<0.5		<0.5		<0.5	<0.5	
Benz(a)anthracene	0.5			<u>0.25</u>	11.6 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Chrysene	0.5			0.25	10.5 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Benzo(b)&(j)fluoranthene	0.5			<u>0.25</u>	12.3 ^c	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Benzo(k)fluoranthene	0.5			<u>0.25</u>	5.2 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Benzo(a) pyrene	0.5		1.4	0.25	<u>11.6°</u>	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Indeno(1,2,3-c,d)pyrene	0.5			0.25	5.7 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Dibenz(a,h)anthracene	0.5			0.25	1.1 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Benzo(g,h,i)perylene	0.5			0.25	7.1 ^c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Carcinogenic PAH (B(a)P equivalent)	1.21	40		0.605	16.356 ^c	0.605	0.605	0.605	0.64	0.855	0.605	0.605		0.605		0.605	0.605	
Sum of reported PAH	8	4000		5.1	197.1°	4.6	4	4	6.7	5.25	4	4		4		4	4	
Metals																		
Arsenic	5	3000	160	11	10	6	5	7	<5	6	6	9		<5		<5	20	
Cadmium	1	900		<1	<1	<1	<1	<1	<1	<1	<1	<1		<1		<1	<1	
Chromium	2	3600	310	10	6	10	9	7	10	9	2	12		4		11	15	
Copper	5	240000	400	24 ^c	119 ^c	19	5	15	17	10	<5	38		18		7	68	
Mercury	0.1	730	1000	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	
Lead	5	1500	1800	77°	158	60	38	45	125	87	33	81		64		26	296	
Nickel	2	6000	55	5°	10	4	2	4	5	<2	<2	4		<2		<2	4	
Zinc	5	400000	360	<u>664</u>	257 ^c	108	133	160	145	42	<5	<u>552</u>		<u>526</u>		75	<u>1610</u>	
Phenol Phenol	٥٦	240000		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	
Pentachlorophenol	2	660		<0.5	<0.5 <2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5 <2	<0.5	
Cyanide				1 **	1 1 <u>-</u>	\ <u>-</u>	,	-	-	1		\ <u></u>		\		1 <u>.</u>		
Cyanide	1	1500		<1	<1	1	<1	<1	<1	<1	<1	<1		<1		<1	<1	
Asbestos																		
Detected Asbestos Weight Sample weight				Nil detected 6.63g	Nil detected 25g	Nil detected 11.6g	Nil detected 9.12g	Nil detected 12g	Nil detected 16.3g	Nil detected 13.8g	Nil detected 8.68g	Nil detected 5.8g	Chrysotile 18.5g	Nil detected 16.2g	Chrysotile 21g	Nil detected 13.4g	Nil detected 12g	Chrysotile 98.8g

All results are in units of mg/kg, except for asbestos.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

- $^{\rm A}$ ASC NEPM 1999 (amended April 2013) Health Investigation Levels (HIL) $^{\rm 'D'}$ (Commercial/Industrial)
- ^A ASC NEPM 1999 (amended April 2013) Ecological Investigation Levels (EIL), C&I (Commercial and Industrial).
- ^B Start of sample, over a 0.1m interval
- ^C Duplicate sample value used where RPD result exceeds 30% and duplicate sample value is greater than test sample value

The Carcinogenic PAH value is calculated by multiplying the concentration of each of the 8 carcinogenic PAH

compounds by its B(a)P toxic equivalence factor and summing these products.

Presented ecological value for benzo(a)pyrene is a low reliability Ecological Screening Level

For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero

EIL for Naphthalene are for fresh (<2years) Naphthalene

EIL for Arsenic are for aged (>2years) Arsenic

EIL for Chromium are the added contaminant limit for aged (>2years) Chromium III in soils of 1% clay, the most conservative of the criteria.

EIL for Copper are the added contaminant limit for aged (>2years) Copper in soils of pH 6.5.

EIL for Lead are the added contaminant limit for aged (>2years) Lead.

EIL for Nickel are the added contaminant limit for aged (>2years) Nickel in soils of 5% CEC the most conservative of the criteria.

EIL for Zinc are the added contaminant limit for aged (>2years) Zinc in soils of 5% CEC and pH of 6.5, the most conservative of the criteria at pH 6.5.

Results shown in **BOLD** are in excess of the HIL Results shown in shading are >250% of the HIL

Results shown in underline are in excess of EIL

Where summation required (PAH) calculation includes components reported as non detected as 1/2 PQL.

Sample Depth (m) ^B Pate	PQL	HIL 'D'	EIL C&I	1.0	1.0	2.0	1.0	1.0	2.0
		HIL D	LIL CAI				10	1.0	2.0
				18/6/18	18/6/18	18/6/18	18/6/18	18/6/18	18/6/18
		mple Profi		Sandy Clay fill, brown with concrete, brick, metal, igneous gravel, some plastic and tyre	Sandy Clay fill, brown with timber, some concrete, tile, plastic, igneous and sandstone gravel and tyre	Sandy Clay fill,m brown mottled green with some igneous gravel, concrete, brick, trace cloth and metal	Sandy Clay fill, brown and pale brown with tree stump, brick, concrete, some metal	Sandy Clay fill, dark brown with some igneous gravel	Sandy Clay, grey mottled pale brown
		ole Purpos collected b		Assessment RCA - RJL	Assessment RCA - RJL	Assessment RCA - RJL	Assessment RCA - RJL	Assessment RCA - RJL	Assessment RCA - RJL
			Эу	KCA - KJL	RCA - RJL	RCA - RJL	NCA - NJL	NOA - NJL	RCA - RJL
Polycyclic Aromatic Hydrocarbons (F		1	070						
<u>'</u>	0.5		370	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
' '	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	0.5			<0.5	<0.5	<0.5	1 ^c	<0.5	<0.5
	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	0.5			<0.5	<0.5	<0.5	1.2 ^c	0.7	<0.5
Pyrene (0.5			<0.5	<0.5	<0.5	1.1 ^c	0.6	<0.5
Benz(a)anthracene	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b)&(j)fluoranthene	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	0.5		1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene (0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene (0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carcinogenic PAH (B(a)P equivalent) 1	.21	40		0.605	0.605	0.605	0.605	0.605	0.605
Sum of reported PAH	8	4000		4	4	4	6.55	4.8	4
Metals		!			!				
Arsenic	5	3000	160	56	6	10	8°	5	<5
Cadmium	1	900		<1	<1	<1	1 ^c	<1	<1
Chromium	2	3600	310	11	7	7	7	3	2
Copper	5	240000	400	75	22	6	34	<5	<5
Mercury	0.1	730		0.2	<0.1	<0.1	<0.1	<0.1	<0.1
	5	1500	1800	647	68	8	131	21	8
Nickel	2	6000	55	3	3	<2	4	<2	<2
Zinc	5	400000	360	<u>4150</u>	292	15	925 ^c	44	5
Phenol									
Phenol		240000		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol Cyanida	2	660		<2	<2	<2	<2	<2	<2
Cyanide Cyanide	1	1500		<1	<1	<1	<1	2	1
Asbestos	-	1500			<u> </u>	<u> </u>	<u> </u>		1 1
Detected Asbestos Weight		I		Nil detected	Nil detected	Nil detected	Nil detected	Nil detected	Nil detected
Sample weight				9.63g	10.8g	6.75g	23g	15.8g	13.9g

All results are in units of mg/kg, except for asbestos.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

- ^A ASC NEPM 1999 (amended April 2013) Health Investigation Levels (HIL) 'D' (Commercial/Industrial)
- C&I (Commercial and Industrial).
- ^B Start of sample, over a 0.1m interval
- ^C Duplicate sample value used where RPD result exceeds 30% and duplicate sample value is greater than test sample value

The Carcinogenic PAH value is calculated by multiplying the concentration of each of the 8 carcinogenic PAH

compounds by its B(a)P toxic equivalence factor and summing these products.

Presented ecological value for benzo(a)pyrene is a low reliability Ecological Screening Level

For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero

- EIL for Naphthalene are for fresh (<2years) Naphthalene
- EIL for Arsenic are for aged (>2years) Arsenic
- ASC NEPM 1999 (amended April 2013) Ecological Investigation Levels (EIL), EIL for Chromium are the added contaminant limit for aged (>2years) Chromium III in soils of 1% clay, the most conservative of the criteria.
 - EIL for Copper are the added contaminant limit for aged (>2years) Copper in soils of pH 6.5.
 - EIL for Lead are the added contaminant limit for aged (>2years) Lead.
 - EIL for Nickel are the added contaminant limit for aged (>2years) Nickel in soils of 5% CEC the most conservative of the criteria.
 - EIL for Zinc are the added contaminant limit for aged (>2years) Zinc in soils of 5% CEC and pH of 6.5, the most conservative of the criteria at pH 6.5.

Results shown in **BOLD** are in excess of the HIL Results shown in shading are >250% of the HIL Results shown in underline are in excess of EIL Where summation required (PAH) calculation includes components reported as non detected as 1/2 PQL.

Sample Identification	PQL	Human Health (Vapour Based) Guideline ^A	BH1	BH2	
Sample Depth (m) B		HSL 'D'	2	3.3	
Date		SAND 2-<4m	27/6/18	27/6/18	
	Sample	Description	Turbid, dark grey, no odour	Turbid, dark grey, no odour	
	Dominan	t Stratum ^C	Sand	Sand	
		le Purpose	Investigation	Investigation	
S	Sample of	collected by	RCA - ZL	RCA - ZL	
Benzene, Toluene, Ethylk	enzene	, Xylene (BTEX)			
Benzene	0.001	5	<0.001	<0.001	
Toluene	0.002	NL	<0.002	<0.002	
Ethylbenzene	0.002	NL	<0.002	< 0.002	
meta- and para-Xylene	0.002		<0.002	<0.002	
ortho-Xylene	0.002		<0.002	<0.002	
Total Xylenes	0.004	NL	0.002	0.002	
Polycyclic Aromatic Hydr	7	ns (PAH)			
Naphthalene	0.005	NL	<0.005	<0.005	
Total Recoverable Hydro	carbons	(TRH)			
TRH C ₆ -C ₁₀	0.02		<0.02	<0.02	
TRH >C ₁₀ -C ₁₆	0.1		<0.1	<0.1	
TRH >C ₁₆ -C ₃₄	0.1		<0.1	<0.1	
TRH >C ₃₄ -C ₄₀	0.1		<0.1	<0.1	
F1	0.02	6	<0.02	<0.02	
F2	0.1	NL	<0.1	<0.1	

All results are in units of mg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

F1 = TRH C_6 - C_{10} minus BTEX. F1 PQL deemed equal TRH C_6 - C_{10} .

NL designates 'Not Limiting' indicating that the pore water concentration required to constitute a vapour risk is higher than the solubility capacity for that compound based on a petroleum mixture. Vapour is therefore not a risk for this compound.

Results for TRH have been compared to TPH guidelines.

Results shown in shading are in excess of the HSL

Where summation required (Xylene, F1) calculation includes components reported as non detected as 1/2 PQL.

^A ASC NEPM 1999 (as amended 2013) Vapour Based Health Screening Level (HSL) 'D' (Commercial/Industrial)

^B Sample depths presented are as encountered prior to commencement of sampling

^C Note that this is a generalisation for the purpose of comparing to the HSL criteria. Where two strata equally represented, most conservative criterion used

Sample Identification	PQL		cosystem eline ^A	Human Health (Ingestion)	BH1	BH2
Sample Depth (m) ^C] FQL	99% Fresh	95% Fresh	Guideline ^B	2	3.3
Date		0070110011	0070110011	Guidonnio	27/6/18	27/6/18
			Turbid, dark	Turbid, dark		
			•	Description	grey, no odour	grey, no odour
				ple Purpose	Investigation	Investigation
			Sample	collected by	RCA - ZL	RCA - ZL
Benzene, Toluene, Ethylbenze	ene, Xylene	(BTEX)				
Benzene	0.001		0.95	0.001	<0.001	<0.001
Toluene	0.002		0.18	0.8	<0.002	<0.002
Ethylbenzene	0.002		0.08	0.3	<0.002	<0.002
meta- and para-Xylene	0.002		0.275		<0.002	<0.002
ortho-Xylene	0.002		0.35		<0.002	<0.002
Total Xylenes	0.004			0.6	0.002	0.002
Total Recoverable Hydrocarbo		.		r	•	r
TRH C ₆ -C ₁₀	0.02				<0.02	<0.02
TRH > C_{10} - C_{16}	0.1				<0.1	<0.1
TRH >C ₁₆ -C ₃₄	0.1				<0.1	<0.1
TRH >C ₃₄ -C ₄₀	0.1				<0.1	<0.1
TRH C ₆ -C ₄₀	0.32		0.007			
Polycyclic Aromatic Hydrocar		\	0.007			
Acenaphthene	0.001) 			<0.001	<0.001
Acenaphthylene	0.001				<0.001	<0.001
Anthracene ^D	0.001	0.00001			<0.001	<0.001
Benz(a)anthracene	0.001	0.00001			<0.001	<0.001
. ,	-	0.0001		0.00001	<0.001	<0.001
Benzo(a) pyrene ^D	0.0005	0.0001		0.00001		
Benzo(b)&(j)fluoranthene	0.001				<0.001 <0.001	<0.001 <0.001
Benzo(g,h,i)perylene Benzo(k)fluoranthene	0.001				<0.001	<0.001
Chrysene	0.001				<0.001	<0.001
Dibenz(a,h)anthracene	0.001				<0.001	<0.001
	0.001	0.001			<0.001	<0.001
Fluoranthene ^D Fluorene	0.001	0.007			<0.001	<0.001
Indeno(1,2,3-c,d)pyrene	0.001				<0.001	<0.001
Naphthalene	0.001		0.016		<0.001	<0.001
Phenanthrene ^D	0.001	0.0006	0.010		<0.001	<0.001
Pyrene	0.001	0.0000			<0.001	<0.001
Sum of reported PAH	0.001				0.00775	0.00775
Metals	0.0100				0.00773	0.00770
Arsenic	0.001		0.013	0.01	0.006	0.005
Cadmium	0.0001		0.0002	0.002	<0.0001	<0.0001
Chromium	0.001		0.001	0.05	<0.001	0.001
Copper	0.001		0.0014	2	<0.001	<0.001
Lead	0.001		0.0034	0.01	<0.001	<0.001
Mercury ^D	0.0001	0.00006	-	0.001	<0.0001	<0.0001
Nickel	0.001		0.011		0.002	0.005
Zinc	0.005		0.008		0.002	0.009
Phenois	3.000		3.000		3.00.	3.000
Phenol	0.001		0.32		<0.001	<0.001
2-Chlorophenol	0.001		0.49	0.3	<0.001	<0.001
2,4-Dichlorophenol	0.001		0.16	0.2	<0.001	<0.001
2,4,6-Trichlorophenol ^D	0.001	0.003		0.02	<0.001	<0.001
Pentachlorophenol ^D	0.002	0.0036		0.01	<0.002	<0.002

All results are in units of mg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

ANZECC guidelines in italics are low level reliability guidelines

ANZECC arsenic guideline based on As (V) for fresh, the lowest of presented guidelines.

NHMRC arsenic guidelines are based on total arsenic

ANZECC and NHMRC guidelines for chromium are based on Cr (VI)

ANZECC guidelines for mercury are based on inorganic mercury.

NHMRC guidelines for mercury are based on total mercury.

NHMRC guidelines for total cyanide are based on cyanogen chloride (as cyanide).

Results for TRH have been compared to TPH guidelines.

Results shown in shading are in excess of the 99% aquatic ecosystems guidelines

Results shown in **BOLD** are in excess of the 95% aquatic ecosystems guidelines

Results shown in $\underline{\text{underline}}$ are in excess of the human health (ingestion) guideline

Where summation required (Xylene, PAH) calculation includes components reported as non detected as 1/2 PQL.

Prevailing aquatic condition assumed fresh, marine conditions are however plausible as site lies close to the mouth of Cockle Creek on Lake Macquarie

 $^{^{\}rm A}$ ANZECC 2000 % Protection Level for Receiving Water Type.

^B NHMRC Australian Drinking Water Guidelines, 2011.

^C Sample depths presented are as encountered prior to commencement of sampling

^D Bioaccummulative Compounds