Phase 2 Environmental Site Assessment, Parcel 13

Prepared for:
Hydro Aluminium Kurri Kurri Pty Ltd

On behalf of:

Prepared by:
ENVIRON Australia Pty Ltd

Date:
April 2015

Project Number:
AS130348

ENVIRON

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VERSION CONTROL RECORD

Document File Name	Date Issued	Version	Author	Reviewer
AS130348 Parcel13_Phase 2_D1	March 2014	Draft 1	K Greenfield	F Robinson
AS130348 Parcel13_Phase 2_Final for Rezoning	April 2015	Draft 1	K Greenfield	F Robinson

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Acronyms and Abbreviations

ACM	Asbestos Containing Materials
AHD	Australian Height Datum
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
B(a)P	Benzo(a)pyrene
BGL	Below Ground Level
BTEX	Benzene, Toluene, Ethylbenzene & Xylenes (Monocyclic aromatic Hydrocarbons)
CT	Certificate of Title
DEC	NSW Department of Environment and Conservation, now EPA
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	NSW Environment Protection Authority
ESA	Environmental Site Assessment
F	Fluoride
GMU	Groundwater Management Unit
GPS	Global Positioning System
Ha	Hectare
HIL	Health Investigation Level
HSL	Health Screening Level
HRA	Health Risk Assessment
km	Kilometres
LOR	Limit of Reporting
m	Metres
Mercury	Inorganic mercury unless noted otherwise
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Fe: Iron, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury, Se: Selenium
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
m AHD	Metres relative to the Australian Height Datum
m BGL	Metres below ground level
m TOC	Metres below top of casing
ML	Megalitre, one million litres
mg/L	Micrograms per Litre
NATA	National Association of Testing Authorities
NC	Not Calculated
ND	Not Detected
NEHF	National Environmental Health Forum
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NSW	New South Wales
n	Number of Samples
OH&S	Occupational Health & Safety
PAH	Polycyclic Aromatic Hydrocarbons
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
US EPA	United States Environment Protection Authority
µg/L	Micrograms per Litre
VENM	virgin excavated natural material
-	On tables is "not calculated", "no criteria" or "not applicable"

Executive Summary

This report presents the findings of a Phase 2 Environmental Site Assessment undertaken on part of the Hydro Aluminium Kurri Kurri (Hydro) owned land known as Parcel 13. Parcel 13 is approximately 20ha and is accessed from Bowditch Avenue, Loxford and located within the buffer zone and to the east of the Hydro aluminium smelter. Parcel 13 comprises six residential properties, with cleared open grassland with scattered mature trees at the rear of each property. The northern-most property also contains two chicken sheds.

The objectives of the assessment were to assess the potential for contamination at Parcel 13 based on historical and current landuse and to assess the suitability of Parcel 13 for low rural residential (R2) land use.

A Phase 1 Environmental Site Assessment has previously been completed for the Hydro owned lands including Parcel 13 (ENVIRON (22 October 2013) Phase 1 ESA, Hydro Kurri Kurri Aluminium Smelter). The Phase 1 identified that contamination of Parcel 13 may have occurred from dust deposition due to the proximity of the Hydro smelter and from construction/ demolition of buildings constructed with asbestos containing materials.

To assess the potential contaminants of concern on Parcel 13, a site walkover was completed and surface soil samples were collected for across the parcel.

The site walkover identified six lots that are or were previously used for residential purposes. Two of the lots were formerly used for poultry farming and one lot is currently used for this activity. Farm-type wastes were identified in surface fill, on the surface of hummocky ground and stockpiled at various locations across all six lots on Parcel 13 including ACM fragments. Buried wastes, including ACM fragments, were identified at the following locations:

- At the location of the former poultry sheds on Lots 460 and 463;
- In a gully on Lot 458;
- Within a filled-in septic tank on Lot 461;
- In hummocky ground in the centre of Lot 462;
- At three separate areas at the rear of Lot 463.

The dwellings and associated sheds on Parcel 13 were assessed in a Hazardous Materials Audit, which identified asbestos containing building materials in the dwellings and garages on Lots 458, 460, 461, 462 and 463.

The site will be suitable for the proposed low rural residential (R2) land use subject to completion of the following remedial actions:

- Areas impacted by ACM fragments should be evaluated for feasible remediation options including excavation and combined encapsulation at another location within Hydro-owned land.

- For aesthetic reasons, other wastes should also be removed from the parcel and recycled as appropriate.
- The recommendations of the Hazardous Materials Audit should be followed.

ENVIRON consider that Parcel 13 can be made suitable for the proposed low rural residential land use following remediation. A Remedial Action Plan will be completed to assess the remedial options and outline the requirements for remediation and validation.

Hydro has separately engaged a NSW EPA-accredited Site Auditor to review the investigations completed and the Remedial Action Plan and to complete an interim opinion letter, indicating that the site can be made suitable for the proposed landuse.

1 Introduction

1.1 Background

This report presents the findings of a Phase 2 Environmental Site Assessment undertaken on part of the Hydro Aluminium Kurri Kurri Pty Limited (Hydro) owned land known as Parcel 13. Parcel 13 is located off Bowditch Avenue, Loxford, New South Wales (2326). The location of Parcel 13 is shown in **Figure 1**.

The work has been performed at the request of Hydro Aluminium Kurri Kurri Pty Limited (the "Client").

Hydro is currently evaluating options for the divestment of land parcels for a range of proposed uses following the closure of the smelter in May 2014. A Rezoning Masterplan has been developed that identifies Parcel 13 to comprise land suitable for low rural residential (R2) land use.

A Phase 1 Environmental Site Assessment has previously been prepared for all Hydro owned lands and evaluated the potential for contamination. On Parcel 13, these investigations identified the presence of dwellings likely to contain asbestos and current and former poultry sheds.

It is noted that at the time of the fieldwork, this land parcel was named Employment Land Subarea 13 and as such the soil samples reference this name. The name of the land parcel as referenced in this report changed to Parcel 13 during the rezoning process.

The location of Parcel 13 in the context of the Rezoning Masterplan is shown in **Figure 2**.

1.2 Objectives and Scope of Work

The objectives of the assessment were to assess the potential for contamination at Parcel 13 based on historical and current land use and to assess the suitability of Parcel 13 for the purposes of low rural residential (R2) land use.

The scope of work performed to meet the objectives comprised:

- A review of available information relating to land use to assess the potential for soil, groundwater or surface water contamination arising from historic and current activities;
- A review of published geological, hydrogeological and hydrological data to establish the environmental setting and sensitivity;
- Field work comprising:
  - Collection of surface soil samples to provide a coarse grid assessment to assess the potential for dust deposition from the smelter operations;
  - A site walkover to evaluate other potential locations of buried waste or illegal dumping.
  - Intrusive investigations using a back hoe to investigate areas of fill.
- Data interpretation including comparison against relevant guidelines and a discussion of the findings in terms of human health and environment risk under the current and future land use scenarios.

- Review of options available for remediation or management to render Parcel 13 suitable for the proposed land use.

2 Site Description

2.1 Site Location

Parcel 13 is owned by Hydro Aluminium Kurri Kurri Pty Limited and is located approximately 35km north west of the city of Newcastle and 150km north of Sydney, in the suburb of Loxford, Kurri Kurri, New South Wales, Australia. Parcel 13 is accessed from Bowditch Avenue. The location of Parcel 13 is shown in **Figure 1**.

Parcel 13 is located within the Buffer Zone of the Hydro Aluminium Kurri Kurri Smelter, east of the smelter. The Buffer Zone is an area of land surrounding the smelter that provides a buffer between the smelter and surrounding communities.

The site comprises six residential properties, each with a dwelling and associated sheds. The rear of each property is cleared open grassland with mature trees. Dams are located on the north western boundary of the three central properties. The northern-most property also comprises two poultry sheds, two smaller farm sheds and a dam. Parcel 13 drains to Swamp Creek, located approximately 60m north east of the site. A train line for coal transport is located on the north western site boundary.

Parcel 13 is located within the Cessnock Local Government Area and is zoned RU2 – Rural Landscape under the Cessnock Local Environment Plan.

Parcel 13 is approximately 20 hectares (ha) and comprises the lot numbers and deposited plans (DP) listed in **Table 1**:

Table 1: Lot and Deposited Plans for Parcel 13.

Subarea	Lot/ DP	Area (ha)	Total Area (ha)
Parcel 13	Lot 458 DP755231 Lot 459 DP755231 Lot 460 DP755231 Lot 461 DP755231 Lot 462 DP755231 Lot 463 DP755231	3.8 3.8 2.8 3.1 3.0 3.1	19.6

Land uses surrounding Parcel 13 are as follows:

- North: Rural residential landuse, including a poultry farm, then farmland.
- South east: The Kurri Kurri Campus of Hunter TAFE (education facility) then bushland.
- West: A dedicated coal train line, then bushland.

2.2 Site Setting

2.2.1 Topography

Parcel 13 is located in a low lying area of the Buffer Zone at approximately 12 mAHD. The main entrance off Bowditch Avenue to Parcel 13 extends along its south western boundary and is the highest point on the site. The natural topography slopes to the north west towards Swamp Creek, located approximately 60m west of the site boundary.

2.2.2 Regional Geology

According to the review of the regional geology described on the Sydney Basin Geological Sheet, Parcel 13 is underlain by siltstone, marl and minor sandstone from the Permian aged Rutherford Formation (Dalwood Group) in the Sydney Basin.

Undifferentiated Quaternary alluvium occurs on the surface of Parcel 13 associated with surface water bodies. Quaternary sediments which are associated with Swamp Creek (located approximately 60m west of the site) and the Hunter River consist of gravel, sand, silt and clay.

2.2.3 Site Hydrology

Surface water from Parcel 13 discharges primarily via infiltration and overland flow to Swamp Creek, located approximately 60m west of the site. Swamp Creek discharges into Wentworth Swamp, which in turn discharges to the Hunter River approximately 11km northeast of Parcel 13 near Maitland.

The Wentworth Swamp system is within the Fishery Creek Catchment, where declining stream water quality and a reduction in diversity of native plants and animals has occurred due to population growth and development pressures in the last ten years (Hunter-Central Rivers Catchment Management Authority).

2.2.4 Regional Hydrogeology

Regional groundwater is expected to follow topography and flow northeast towards the surface water bodies that discharge to the Hunter River. Locally, groundwater beneath Parcel 13 is expected to flow west to Swamp Creek located approximately 60m west of the site.

According to the NSW Office of Environment and Heritage (Natural Resource Atlas), there are 21 licensed groundwater abstractions (bores) located within 2km of Parcel 13. The majority of the groundwater bores are located within the aluminium smelter and buffer zone.

Information for 11 bores located in a 1km radius from Parcel 13 has been included in Appendix A. The bores are used for monitoring purposes. No further information, such as depth to water or logging information was provided.

The Hunter River Alluvium Groundwater Management Unit (GMU) is an important groundwater resource to the region. Groundwater extraction for irrigation, urban supply, drought supply, stock, domestic and commercial/ industrial use occurs, with volumes in excess of 10,000ML per annum extracted from the Hunter River Alluvium GMU. Aquifer storage and recovery is also an important use of this GMU. It is noted that the Hunter River GMU is not the primary drinking water supply in the region, although the protection of

drinking water is a water quality objective for the Hunter River (NSW Water Quality and River Flow Objectives)(www.environment.nsw.gov.au/ieo/Hunter/index.htm).

2.3 Site Sensitivity

The sensitivity of Parcel 13 with respect to surface water and groundwater is considered to be moderate based on the following:

- Surface water and groundwater discharge into Swamp Creek, located approximately 60m west of the site, which discharges to the Hunter River via Wentworth Swamp within the Fishery Creek Catchment, approximately 11km northeast of Parcel 13 near Maitland.

- Declining stream water quality and a reduction in diversity of native plants and animals has occurred within the Fishery Creek Catchment and water quality down gradient of Parcel 13 has been impacted by historical coal mining;

- The Hunter River GMU is used for irrigation, urban supply, drought supply, stock, domestic and commercial/ industrial use but it is not the main drinking water supply in the region.

3 Site History

Site history investigations included in the Phase 1 ESA for the Hydro Aluminium Kurri Kurri Smelter, dated 26 August 2013 provided the following historical information about Parcel 13:

- Earliest records (aerial photograph in 1951) shows that Parcel 13 comprised semi-cleared land, with the six lots evident. There do not appear to be developments on any of the lots at this time.
- Residential dwellings were constructed on the six lots between the 1960s and the 1990s. These dwellings and associated sheds remain on site at present.
- Lots 458, 460 and 463 in DP755231 were developed with poultry sheds in the early 1970s. The sheds have since been removed from Lots 460 and 463. Two poultry sheds remain on Lot 458, however they are at present in a different location to where they were originally constructed in the 1970s;
- Parcel 13 is located approximately 650m east of the smelter boundary and may be impacted from smelter dust deposition.

The locations of the current and former poultry sheds and current dwellings are included in **Figures 3 to 8**. Photos are presented in **Appendix C**.

4 Sampling and Analytical Quality Plan

4.1 Potential Areas and Contaminants of Concern

Based on Parcel 13 historical information as discussed in **Section 3**, the following areas of concern were identified:

- Construction and removal of poultry sheds;
- Residential developments on the six lots.
- Smelter dust deposition.

Contaminants of concern associated with the range of previous site activities are:

- Asbestos;
- Fluoride.

4.2 Data Quality Objectives and Data Quality Indicators

Data quality objectives (DQOs) and Data Quality Indicators (DQIs) were developed by ENVIRON using the US EPA seven-step DQO process. Completing the seven-step process helps to define the purpose of the assessment and the type, quality and quantity of data needed to inform decisions relating to the assessment of site contamination.

The seven-step DQO process and DQIs are included in **Appendix F**.

4.3 Sampling Design

The sampling design was optimised following the development of DQOs and DQIs. The sampling design is outlined below. ENVIRON notes that the historical site activities indicate potential contamination to surface soils only. Where fill was identified during the site walkover, a second round of field investigations was completed to assess subsurface soils. No potential contamination sources to surface water or groundwater have been identified.

4.3.1 Fluoride

To assess the potential for fluoride in soil from dust deposition from the Hydro Aluminium Kurri Kurri Smelter, surface soil samples were collected at a rate of one sample per 5ha.

The sample density is lower than that suggested in Table A of NSW EPA (1995) Contaminated Sites: Sampling Design Guidelines. The density is considered adequate for the purposes of this investigation for the following reasons:

- aerial dust deposition is likely to be relatively consistent over the surface of the parcel and therefore sampling on a low density will allow for identification of whether or not dust deposition is an issue; and
- in the event that elevated or variable fluoride concentrations are identified, additional sampling will be completed.

Samples were collected by trowel from surface soils on an approximate grid across open areas of Parcel 13. Sample locations were logged by GPS.

Soil samples were placed into laboratory-supplied paper bags and stored in an ice-filled cooler for transportation to the laboratory. Soil samples were transported to the laboratory under chain of custody conditions. Intra-laboratory duplicate soil samples were collected at a rate of 10%.

Soil samples were analysed for soluble fluoride, as this is the portion of total fluoride that is available for uptake in receptors including biota, flora, fauna and humans. The laboratory was NATA accredited for the analysis.

4.3.2 Asbestos

To assess the potential for asbestos and other illegally dumped wastes to be present at Parcel 13, a site walkover of accessible areas was completed.

The location and type of dumped wastes were detailed on Field Information Sheets and logged by GPS. Where asbestos was confidently identified by the field personnel, no sampling was completed. If not, a sample of potential asbestos containing material (ACM) was collected for laboratory analysis. ACM fragments were collected into a zip-lock bag using dedicated disposable gloves.

ACM fragments were analysed for asbestos identification by a laboratory NATA accredited for the analysis.

4.3.3 Potential Fill

The site walkover identified the potential for fill material at Parcel 13. As such, a second round of fieldwork was completed to assess the potential fill and its potential for contamination.

A back hoe was used to excavate test pits into areas of potential fill identified at Parcel 13. The number of test pits completed at the six lots is as follows:

- Lot 458: 12 test pits;
- Lot 459: 4 test pits;
- Lot 460: 24 test pits;
- Lot 461: 17 test pits;
- Lot 462: 20 test pits;
- Lot 463: 11 test pits.

The test pits were logged by an ENVIRON environmental scientist and soil samples were collected for analysis.

Soil samples were collected into laboratory-supplied acid-rinsed glass jars using dedicated disposable gloves. The soil samples were stored in an ice-filled cooler for transportation to the laboratory. Soil samples were transported to the laboratory under chain of custody conditions. Intra-laboratory duplicate soil samples were collected at a rate of 10%.

Soil samples were analysed for a range of potential contaminants, including heavy metals, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphorous pesticides (OPPs) and asbestos. The laboratory was NATA accredited for the analysis.

5 Basis for Assessment Criteria

5.1 Soil

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

- NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

The variation to the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) was approved on 19 June 2013 by the NSWEPA under the *Contaminated Land Management Act 1997*. NEPM (2013) provide revised health-based soil investigation levels (HILs) and ecological-based investigation levels (EILs) for various land uses, as follows:

- HIL A - residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children day care 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 (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate

- HIL D - commercial/industrial such as shops, offices, factories and industrial sites.

The NEPM 2013 also introduces health-based and ecological screening levels and management limits for petroleum hydrocarbons (HSLs and ESLs). The levels have been derived from recent assessments that more accurately define the exposure mechanisms and risks from sites contaminated with petroleum hydrocarbons.

The objective of the Phase 2 ESA is to assess soil contamination at Parcel 13 in relation to risks posed to human health and the environment under the proposed future land use of rural residential. As such, soil investigation results will be compared against the HIL/HSL Residential A (low density residential), management limits and EILs/ESLs for urban residential/public open space.

- The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use.
- HSLs for soil vapour intrusion from petroleum hydrocarbons - guidelines that prevent accumulation of vapours at concentrations that may represent a health risk. The HSLs are derived for various depths and are for the same generic land uses as for the HILs. The guidelines are relevant were soils are beneath building or structures such as confined spaces.

- EILs for urban residential/ public open space, applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and generally apply to the top 2 m of soil.
- ESLs for urban residential/ public open space, developed for selected petroleum hydrocarbon compounds and fractions and are applicable for assessing risk to terrestrial ecosystems. These are also generally applicable to the top 2m of soil.
- Management Limits where concentrations above these limits may indicate poor aesthetics, high odour and potentially explosive vapour. Management limits are to be applied after consideration of relevant ESLs and HSLs.

The applicable assessment criteria for heavy metals and PAHs in soil are presented in Table 2:

Table 2: Soil Assessment Criteria (mg/kg) – Health and Ecological Investigation Levels

	HIL A	**EIL[1]**
Arsenic	100	100
Cadmium	20	-
Chromium (VI)	100	410 (Cr III, 1% Clay)
Copper	6000	220
Lead	300	1100
Nickel	400	220
Zinc	7,400	630
Mercury (inorganic)	40	-
Fluoride	Ref Table 5	-
Carcinogenic PAHs (as BaP TEQ)	3	-
Total PAHs	300	-
DDT+DDE+DDD	240	180
Aldrin and dieldrin	6	-
Chlordane	50	-
Endosulfan	270	-
Endrin	10	-
Heptachlor	6	-
HCB	10	-
Methoxychlor	300	-
Mirex	10	-
Toxaphane	20	-
Atrazine	320	-
Chlorpyrifos	160	-
Bifenthrin	600	-

1 EILs for urban residential and public open spaces calculated using the NEPM (2013) EIL Calculation Spreadsheet and a pH of 5 and Cation Exchange Capacity (CEC) of 15cmolc/kg for Parcel 13 from ALS report ES408784001.

The applicable assessment criteria for petroleum hydrocarbons in soil are presented in Table 3 and Table 4:

Table 3: Soil Assessment Criteria for Vapour Intrusion - HSL A & HSL B (mg/kg) - Sand				
	0 to <1m	**1m to <2m**	**2m to <4m**	**4m+**
Toluene	160	220	310	540
Ethylbenzene	55	NL	NL	NL
Xylenes	40	60	95	170
Naphthalene	3	NL	NL	NL
Benzene	0.5	0.5	0.5	0.5
F1(4)	45	70	110	200
F2(5)	110	240	440	NL

1 Land use settings are equivalent to those described in Section 5.1 (above). HSLs for vapour intrusion for high density residential assume residential occupation of the ground floor. If communal car parks or commercial properties occupy the ground floor, HSL D should be used.

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

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

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

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

Table 4: ESLs and Management Limits for Petroleum Hydrocarbons in Soil			
TPH fraction	**Soil texture**	**ESLs (mg/kg dry soil)**	**Management Limits[1] (mg/kg dry soil)**
		Urban residential and public open space	**Residential, parkland and public open space**
F1 C6- C10	Fine	180*	800
F2 >C10-C16	Fine	120*	1000
F3 >C16-C34	Fine	1300	3500
F4 >C34-C40	Fine	5600	10000
Benzene	Fine	65	-
Toluene	Fine	105	-
Ethylbenzene	Fine	125	-
Xylenes	Fine	45	-
Benzo(a)pyrene	Fine	0.7	-

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

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

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

[4] To obtain F1, subtract the sum of BTEX from C6-C10 fraction and subtract naphthalene from >C10-C16 to obtain F2.

The HSLs for asbestos are applicable for assessing human health risk via the exposure pathway of inhalation of airborne asbestos and are presented in **Table 5**. The HSLs are generic to all soil types.

Table 5. Health screening levels for asbestos contamination in soil Health Screening Level (w/w)				
Form of asbestos	**Residential A[1]**	**Residential B[2]**	**Recreational C[3]**	**Commercial/ Industrial D[4]**
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF[1] (friable asbestos)	0.001%			
All forms of asbestos	No visible asbestos for surface soil			

1. The screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.

NEPM (2013) do not provide criteria for fluoride in soils in Australia. Therefore, ENVIRON (2013) conducted a preliminary level Human Health Risk Assessment (HRA) specific to fluoride in order to derive a specific preliminary screening level for fluoride for the Hydro Aluminium Kurri Kurri Smelter . The screening levels are protective of the range of human receptors and are provided in **Table 6**:

Table 6: Site Specific Soil Assessment Criteria (mg/kg) for Fluoride	
Preliminary screening levels	
Land Use	**Preliminary screening level**
Residential landuse	F 440mg/kg
Recreational landuse	F 1200mg/kg
Commercial/ industrial landuse	F 17000mg/kg

Soil investigation results for the samples taken from a grid formation across Parcel 13 have been compared against the residential land use screening level. The fluoride 'residential land use' screening level is considered to be suitably protective of both 'residential' and 'rural residential' land use because the exposure pathways (including vegetable ingestion) and behavioural assumptions (e.g. soil ingestion rate) for the child are considered to be identical under residential and rural residential land use scenarios.

There is a possibility that the rural plots may contain a low density of domestic livestock such as poultry and goats, however there is limited evidence of fluoride accumulation in milk and edible tissues of animals fed high levels of fluorides (ATSDR, 2003; NAS, 1971). Rather, fluoride accumulates primarily (up to approximately 99%) in the skeletal tissues of terrestrial animals that consume fluoride-containing foliage (WHO, 1997; ATSDR, 2003). This assumption is supported by site-specific data collected during the 29th annual cattle survey conducted in March 2012 on cattle located within the site's buffer zone, and surrounding areas (AECOM, 2013). The results of this survey concluded that cattle has had little or no exposure to excess environmental fluoride; skeletal fluoride levels decreased compared to 2011 levels, with all fluoride measurements below the toxic threshold; and all cattle examined were in good health and body condition. Consequently, the residential screening level is considered to be suitably protective of rural residential land use that may contain a low density of domestic livestock.

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

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

6 Results

6.1 Site Walkover

A site walkover was completed to identify areas of environmental concern, such as illegally dumped wastes and fill at Parcel 13. The entrance to Parcel 13 is from Bowditch Avenue, which borders the eastern site boundary. The site comprises six rural residential lots, Lots 458 to 463, with dwellings and associated sheds on four of the six lots. Each lot generally comprises buildings in the eastern portion of the lot, close to Bowditch Avenue, with the remainder of the lot comprising cleared open grassland with some mature trees and farm dams near the western site boundary. The exception is Lot 458, which comprises two active poultry sheds and several farm buildings including a shipping container and a fuel tank at the rear of the dwelling.

The dwellings and associated sheds were assessed separately in a Hazardous Materials Audit, a copy of which is included in **Appendix G**.

The site walkover identified hummocky ground, small fill mounds, former poultry shed footprints with associated debris such as metal pipes and concrete rubble, former building footprints and small stockpiles of wastes such as bricks, tyres, scrap metal and ACM fragments. A description of the areas of concern identified at each lot on Parcel 13 is outlined in **Table 7**.

The locations of areas of concern identified during the field investigations are shown in **Figures 3 to 8**. Photographs are included in **Appendix B**. Field Information Sheets are included in **Appendix C**.

Table 7: Summary of Areas of Concern Identified during Site Walkover

Lot	Poultry Shed/ Building Footprints	Hummocky Ground	Fill Mounds	Waste Stockpiles
Lot 458	Two current poultry sheds and one former poultry shed footprint identified.	Two areas of hummocky ground identified at the rear of the poultry sheds.	Six areas of fill identified close to poultry sheds, including buried and surface ACM fragments.	Waste stockpile on southern boundary fence, included metal framework, tyres, timber, chemical drums and plastic industrial chemical containers.
Lot 459	One shed footprint was identified near the house, with ACM scattered over the footprint.	Two areas of hummocky ground identified, one with scrap metal and concrete pieces visible.	Two identified, one at the rear of the house and one 100m west of the house.	A stack of old roof tiles was identified.
Lot 460	Two poultry shed footprints and one building footprint, with minor surface debris including the concrete slabs. The former building footprint behind the house included asbestos sheeting and large ACM fragments.	Two areas of hummocky ground, one at the rear of the former poultry sheds and one at the front of the former poultry sheds, both with bricks and concrete visible on the surface.	One identified near the dam in the western portion of the lot, which appeared to be soil only.	Waste only associated with former building footprints.
Lot 461	Three former building footprints were identified, with ACM fragments scattered across the concrete slabs. The building footprints do not represent former poultry sheds, due to shape and size. One large concrete slab extends parallel to Bowditch Avenue, whereas former poultry sheds extend perpendicular to the road. Other concrete slabs, one with	Two areas of hummocky ground identified, one immediately at the rear of the current house with bricks and concrete visible, and one in the eastern portion of the lot.	Two fill mounds identified, one with a metal pipe visible and one with partially buried fence posts under a tree.	The building footprints and fill mounds included wastes such as metal sheeting, an old drum, ceramic water pipes, bricks, concrete and ACM fragments.

Table 7: Summary of Areas of Concern Identified during Site Walkover

Lot	Poultry Shed/ Building Footprints	Hummocky Ground	Fill Mounds	Waste Stockpiles
	a hole in it and remnants of ceramic pipe, indicates former unknown use.			
Lot 462	Former building footprints were identified within a fenced area near Bowditch Avenue with ACM fragments scattered on the ground surface.	One area identified behind an old shed, with sheet metal and concrete footings evident.	Potential fill mounds were identified between Bowditch Avenue and the dwelling on site, with gravelly exposed soil.	Two stockpiles, one of old fence posts and wire, and one of old tyres and scrap metal were identified.
Lot 463	Two footprints of former sheds, has thick grass cover. ACM fragments, scrap metal and concrete rubble identified, metal pipes still in place.	None identified	Fill mounds identified at two locations, metal machine parts visible in one grass covered mound. Concrete pieces with reinforcing bar and bricks were visible on the surface of the other mound.	Wastes including sheet metal, concrete and bricks identified on ground surface between the two poultry shed footprints.

6.2 Soil Investigations

6.2.1 Fluoride and Asbestos

Six surface soil samples were collected from across Parcel 13 as per the sampling design to assess the potential for fluoride in soil from dust deposition from the Hydro Aluminium Kurri Kurri Smelter as shown in **Figures 3 to 8**. A generalised lithology of the surface soils encountered at Employment Land Subarea 13 is as follows:

- Topsoil: Silt, dark brown, slightly moist.

Seven ACM fragments were collected from representative areas of each lot for laboratory analysis. In addition, a 10m by 10m grid was set up at two locations of former poultry sheds, one on Lot 460 and one on Lot 463, and a walkover screening survey conducted over those areas comprising two passes with a 90º directional change between them, as per NEPM (2013). ACM fragments were not identified within the 10m by 10m grid at either area during the intensive walkover.

6.2.1 Potential Fill

Sixty two test pits were excavated in areas of potential fill across five of the six lots, as shown in **Figures 3 to 8**. The findings from the test pits on each lot are outlined in **Table 8**.

Table 8: Summary of Intrusive Investigations

Lot	No. of Test Pits	Fill	Depth of Fill	Natural Ground	Depth of Natural Ground
Lot 458	12	Three separate areas of deep fill were identified at the rear of the lot (TP16, TP19 and TP23). At each location, fill included wastes such as glass, metal sheeting, fence posts, car parts, electrical wire, plastic containers, ceramic pipe, house bricks, concrete pieces and ACM fragments. These areas appear to be distinct excavations for burial of wastes. Surrounding test pits did not identify extensive waste burial.	TP16: 0.5m to 2.0m TP19: 0m to 1.8m TP23: 0m to 2.7m	Sandy CLAY, orange/ grey, with some gravel, no odour.	TP16: From 2.0m TP19: From 1.8m TP23: From 2.7m
Lot 459	4	Clay fill material was identified on Lot 459. No wastes were observed within the fill.	0.7m to 1.3m	CLAY, orange/ red	Generally from 0.7m
Lot 460	24	Generally, scattered surficial fill was identified to a maximum depth of 0.5m bgs. This surficial fill included wastes such as house bricks, metal sheeting, car tyres, electrical wire, fence wire, plastic sheeting, glass, concrete pieces	Surficial fill: 0m to 0.5m	CLAY, orange/ grey, no odour	Generally from 0.4m in areas of fill

		and ACM fragments. One test pit (TP29) identified deeper fill to 1.9m comprising small pieces of metal scrap.	 TP29: 0m to 1.9m		
Lot 461	17	Surficial fill was identified to a maximum depth of 1m bgs at the rear of a former tennis court. This surficial fill included wastes such as house bricks, timber, scrap metal, roof tiles, fence wire, concrete pieces, glass, broken crockery and ACM pieces. One test pit (TP8) was excavated into a septic tank that has been filled in. Wastes within the filled in tank included house bricks, ceramic pipe and concrete pieces.	Surficial fill: generally 0m to 0.5m, up to 1.0m at TP4. TP8: 0m to 2.0m	Sandy CLAY, orange/ grey, moist	Generally from 0.4m in areas of fill
Lot 462	20	Fill was identified in the footprint of the former house and in hummocky ground surrounding the house footprint, including wastes such as timber, house bricks, plastic, PVC pipe, electrical cable, tile pieces and ACM fragments. A mound filled with wastes (SP3) was identified in the centre of the lot. From the surface, 0.5m of ACM fragments	Former house footprint: 0.3m to 0.5m. Filled gully: 0.0m to 2.1m	CLAY, orange/ brown, no odour CLAY, orange/ grey, wet	Former house footprint: From 0.5m Filled gully: from 2.1m

		were uncovered. Below the ACM fragments, other wastes including chemical drums, rubber tubing, steel beams, metal pipes, carpet, house bricks, concrete pieces, concrete bricks, tile pieces, chicken wire, timber, burnt timber, metal gutters, plastic containers and ACM fragments were buried to a depth of 2.1m bgs.			
Lot 463	11	Generally, fill was found buried below the ground surface at the location of the former poultry sheds and included wastes such as ash/ slag, metal, timber and ACM fragments. Buried ACM fragments were identified in a gully at the rear of the lot (TP9) between the ground surface and 0.3m bgs.	Generally 0.2m to 1.0m Gully: 0.0m to 0.3m	Sandy CLAY, orange/ grey, no odour	From 0.2m to1.0m From 0.3m

6.3 Soil Results

Soil analytical results are presented in **Table A** in Appendix E. Laboratory reports are included in **Appendix F**. A summary of the soil results is presented in **Table 5**.

Table 5: Summary of Soil Results

Analyte	No. of Samples	Maximum Concentration (mg/kg)	No. exceeding Site Criteria	Criteria Exceeded (mg/kg)
Fluoride	6	10	0	-
Arsenic	17	18	0	-
Cadmium	17	1	0	-
Chromium	17	66	0	-
Copper	17	52	0	-
Lead	17	57	0	-
Nickel	17	31	0	-
Zinc	17	572	0	-
Mercury	17	0.1	0	-
BaP TEQ	15	1.2	0	-
Total PAHs	15	8.5	0	-
Benzene	15	<0.2	0	-
Toluene	15	<0.5	0	-
Ethyl benzene	15	<0.5	0	-
Xylene	15	<0.5	0	-
TRH C6-C10	15	<10	0	-
TRH >C10-C16	15	170	1	110 (HSL)
TRH >C16-C34	15	1080	0	-
TRH >C34-C40	15	240	0	-
OCPs excluding DDE + DDD + DDT	11	<LOR	0	-
Sum of DDE + DDD+ DDT	11	1.13	0	-
OPPs	11	<LOR	0	-
Asbestos	59	16 – Chrysoite, crocidolite and amosite	16	Presence

The results of surface soil sampling for fluoride demonstrate that the conditions at Parcel 13 were not impacted by stack particulate fallout from the Hydro Aluminium Kurri Kurri Smelter.

The results of fill sampling indicate that surface soils from 0m to 0.3m at one location (TP7 on Lot 463) are impacted by petroleum hydrocarbons at concentrations exceeding the HSL for vapour intrusion in sandy soils. The log for this test pit indicates the fill soils are impacted with ash or slag and no odour was evident.

The results of fill sampling indicate that some fill soils are impacted with zinc at concentrations exceeding the EIL. The logs indicate that the elevated zinc concentrations are associated with scrap metal within the fill, which is the likely source of zinc.

Chrysotile, crocidolite and amosite asbestos were identified in the ACM fragments collected. Asbestos was identified in 9 of the 52 soil samples collected for asbestos analysis, comprising both bonded asbestos cement sheeting fragments and degraded/ friable asbestos cement sheeting fragments.

6.4 Quality Assurance/ Quality Control

A quality assurance assessment for this report is presented in **Appendix F**. An assessment was made of data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations, as outlined in NSW DEC (2006) and NSW EPA (2007) guidelines. Overall it is considered that the completed investigation works and the data are of suitable quality to meet the project objectives.

7 Site Characterisation

7.1 Conceptual Site Model

Parcel 13 consists of six residential properties with dwellings and associated sheds located close to the eastern site boundary with cleared land at the rear of each property. One of the properties comprises a poultry farm. Parcel 13 is bounded by Bowditch Avenue to the east, a dedicated coal railway line to the west and other rural properties to the north and south. The site is located in the east of the Buffer Zone of the Hydro Aluminium Kurri Kurri Smelter.

Parcel 13 was developed for rural residential landuse, including poultry farming, between the 1960s and the 1990s. Poultry sheds were identified on three lots, Lots 458, 460 and 463, in aerial photographs from the early 1970s. Poultry farming is currently undertaken on only one of the six lots, Lot 458. Poultry sheds on the other lots are understood to have been demolished.

The location of these former poultry sheds on Lots 460 and 463 were confirmed during the site walkover. The walkover identified surficial debris associated with the former poultry sheds, which was generally located within and surrounding the shed footprints and included concrete rubble, metal scrap and scattered ACM fragments. Buried debris was identified during the intrusive investigations scattered over the area of the former poultry sheds up to depths of 1m bgs and comprising wastes such as house bricks, timber, scrap metal, roof tiles, fence wire, concrete pieces, glass, broken crockery, ash/slag and ACM pieces.

The location of other former buildings such as dwellings and sheds were also confirmed during the site walkover. Surficial and buried debris associated with the former dwellings was also identified, generally in the vicinity of the former buildings. On Lot 460, buried debris was identified in hummocky ground at the rear of the tennis court and included house bricks, timber, scrap metal, roof tiles, fence wire, concrete pieces, glass, broken crockery and ACM pieces to a depth of 1.0m bgs.

Other farm-type wastes were identified in surface fill, on the surface of hummocky ground and stockpiled at various locations across all six lots on Parcel 13 including fence posts, metal framework, metal scrap and metal sheeting, an old drum, chemical drums, timber, tyres, bricks, metal machine parts and ACM fragments. ACM fragments were identified buried just below ground surface in a gully at the rear of Lot 463. It is noted that no wastes were observed within the fill material on Lot 459.

The intrusive investigations identified deeper areas of buried wastes at the following locations:

- Within a gully on Lot 458, including house bricks, ceramic pipe, metal pipe, machinery parts, concrete pieces, plastic containers, wire, fence posts, metal sheeting and ACM fragments. The buried wastes were identified to a depth of 2.7m bgs.

- Within a septic tank on Lot 461 that has been filled in. Wastes within the filled in tank included house bricks, ceramic pipe and concrete pieces to a depth of 2.0m bgs.

- In hummocky ground in the centre of Lot 462, including chemical drums, rubber tubing, steel beams, metal pipes, carpet, house bricks, concrete pieces, concrete bricks, tile pieces, chicken wire, timber, burnt timber, metal gutters, red containers and ACM fragments. The buried wastes were identified to a depth of 2.1m bgs.

- Buried wastes were identified in three separate areas at the rear of Lot 463. At each location, fill included wastes such as glass, metal sheeting, fence posts, car parts, electrical wire, plastic containers, ceramic pipe, house bricks, concrete pieces and ACM fragments. These areas appear to be distinct excavations for burial of wastes. Surrounding test pits did not identify extensive waste burial. The maximum depth of the buried waste was to 2.7m bgs.

Laboratory analysis on soil samples from fill associated with the buried and surficial wastes indicated there is limited impact to the land from the waste materials, with no impact from heavy metals, PAHs, OCPs or OPPs.

Surface soils from 0m to 0.3m at one location (TP7 on Lot 463) are impacted by petroleum hydrocarbons at concentrations exceeding the HSL for vapour intrusion in sandy soils. The log for this test pit indicates the fill soils are impacted with ash or slag and no odour was evident. This result is not considered representative of fill material with ash or slag, as other similar samples did not have elevated petroleum hydrocarbon results. This result is not considered to represent a risk to human health, as there is no residence in this area.

Asbestos in the form of both bonded asbestos cement sheeting fragments and degraded/ friable asbestos cement sheeting fragments were identified throughout the surficial and buried fill across the six lots in Parcel 13. Asbestos represents a health risk to current and future site users and must be remediated for Parcel 13 to be considered suitable for the current and future landuse.

The remainder of the surfcial and filled wastes are aesthetically unsuitable for the future rural residential landuse scenario and should also be remediated.

The dwellings and associated sheds on Parcel 13 were assessed in a Hazardous Materials Audit, which identified asbestos containing building materials in the dwellings and garages on Lots 458, 460, 461, 462 and 463.

Parcel 13 has not been affected by dust deposition of fluoride from the Hydro Aluminium Kurri Kurri Smelter, with fluoride concentrations in surface soil are below the preliminary screening level for residential landuse. It is noted that there is currently no source of aerial fluoride emissions, as the smelter is in a care and maintenance mode.

7.2 Waste Characterisation

Wastes identified at the six lots generally comprise municipal wastes (non-putrescible). Wastes are dry, and no free liquid was identified during excavations.

The majority of the asbestos identified across the six lots on Parcel 13 comprised bonded ACM fragments, which classify as Asbestos Waste. Bonded asbestos can be remediated by a contractor with a Non-friable Class B Asbestos Removal Licence.

In addition, asbestos fines (ACM <7mm) were identified in one soil sample from Lot 458 and degraded and friable ACM fragments were identified in soil samples from Lots 462 and 463. These types of asbestos also classify as Asbestos Waste, however asbestos fines and friable asbestos must be remediated by a contractor with a Friable Class A Asbestos Removal Licence.

8 Conclusions and Recommendations

This report presents the findings of a Phase 2 Environmental Site Assessment undertaken on part of the Hydro Aluminium Kurri Kurri (Hydro) owned land known as Parcel 13. Parcel 13 is approximately 20ha and is accessed from Bowditch Avenue, Loxford and located within the buffer zone and to the east of the Hydro aluminium smelter. Parcel 13 comprises six residential properties, with cleared open grassland with scattered mature trees at the rear of each property. The northern-most property also contains two chicken sheds.

The objectives of the assessment were to assess the potential for contamination at Parcel 13 based on historical and current landuse and to assess the suitability of Parcel 13 for low rural residential (R2) land use.

A Phase 1 Environmental Site Assessment has previously been completed for the Hydro owned lands including Parcel 13 (ENVIRON (22 October 2013) Phase 1 ESA, Hydro Kurri Kurri Aluminium Smelter). The Phase 1 identified that contamination of Parcel 13 may have occurred from dust deposition due to the proximity of the Hydro smelter and from construction/ demolition of buildings constructed with asbestos containing materials.

To assess the potential contaminants of concern on Parcel 13, a site walkover was completed and surface soil samples were collected for across the parcel.

The site walkover identified six lots that are or were previously used for residential purposes. Two of the lots were formerly used for poultry farming and one lot is currently used for this activity. Farm-type wastes were identified in surface fill, on the surface of hummocky ground and stockpiled at various locations across all six lots on Parcel 13 including ACM fragments. Buried wastes, including ACM fragments, were identified at the following locations:

- At the location of the former poultry sheds on Lots 460 and 463;
- In a gully on Lot 458;
- Within a filled-in septic tank on Lot 461;
- In hummocky ground in the centre of Lot 462;
- At three separate areas at the rear of Lot 463.

The dwellings and associated sheds on Parcel 13 were assessed in a Hazardous Materials Audit, which identified asbestos containing building materials in the dwellings and garages on Lots 458, 460, 461, 462 and 463.

The site will be suitable for the proposed low rural residential (R2) land use subject to completion of the following remedial actions:

- Areas impacted by ACM fragments should be evaluated for feasible remediation options including excavation and combined encapsulation at another location within Hydro-owned land.

- For aesthetic reasons, other wastes should also be removed from the parcel and recycled as appropriate.
- The recommendations of the Hazardous Materials Audit should be followed.

ENVIRON consider that Parcel 13 can be made suitable for the proposed low rural residential land use following remediation. A Remedial Action Plan will be completed to assess the remedial options and outline the requirements for remediation and validation.

Hydro has separately engaged a NSW EPA-accredited Site Auditor to review the investigations completed and the Remedial Action Plan and to complete an interim opinion letter, indicating that the site can be made suitable for the proposed landuse.

9 References

AECOM. 2013. Hydro Aluminum – 2012 Annual Environmental Management Review. 2 June 2013;

ANZECC & NHMRC (1992) Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites;

ENVIRON (2013) Preliminary Screening Level, Health Risk Assessment for Fluoride and Aluminium, Part of the Kurri Kurri Aluminium Smelter, Hart Road, Loxford;

ENVIRON (2013) Phase 1 ESA, Hydro Kurri Kurri Aluminium Smelter;

Hunter Catchment Management Trust (2000) Wallis and Fishery Creeks Total Catchment Management Strategy;

National Academy of Sciences. 1971a. Biologic effects of atmospheric pollutants: Fluorides. Washington, DC: National Academy of Sciences, National Research Council, Committee on Biologic Effects of Atmospheric Pollutants, 239;

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure (NEPM);

NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme (Second Edition);

NSW DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination;

NSW DECC (2008) Waste Classification Guidelines;

World Health Organisation (1997) Environmental Health Criteria for Fluorides and Fluorosis. 2nd ed. Internal Technical Report, International Program on Safety, WHO, Geneva.

10 Limitations

ENVIRON Australia prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Kurri Kurri Pty Ltd dated 18 September 2013 and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken as part of this investigation, based on past and present known uses of Parcel 13. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous.

Site conditions may change over time. This report is based on conditions encountered at Parcel 13 at the time of the report and ENVIRON disclaims responsibility for any changes that may have occurred after this time.

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

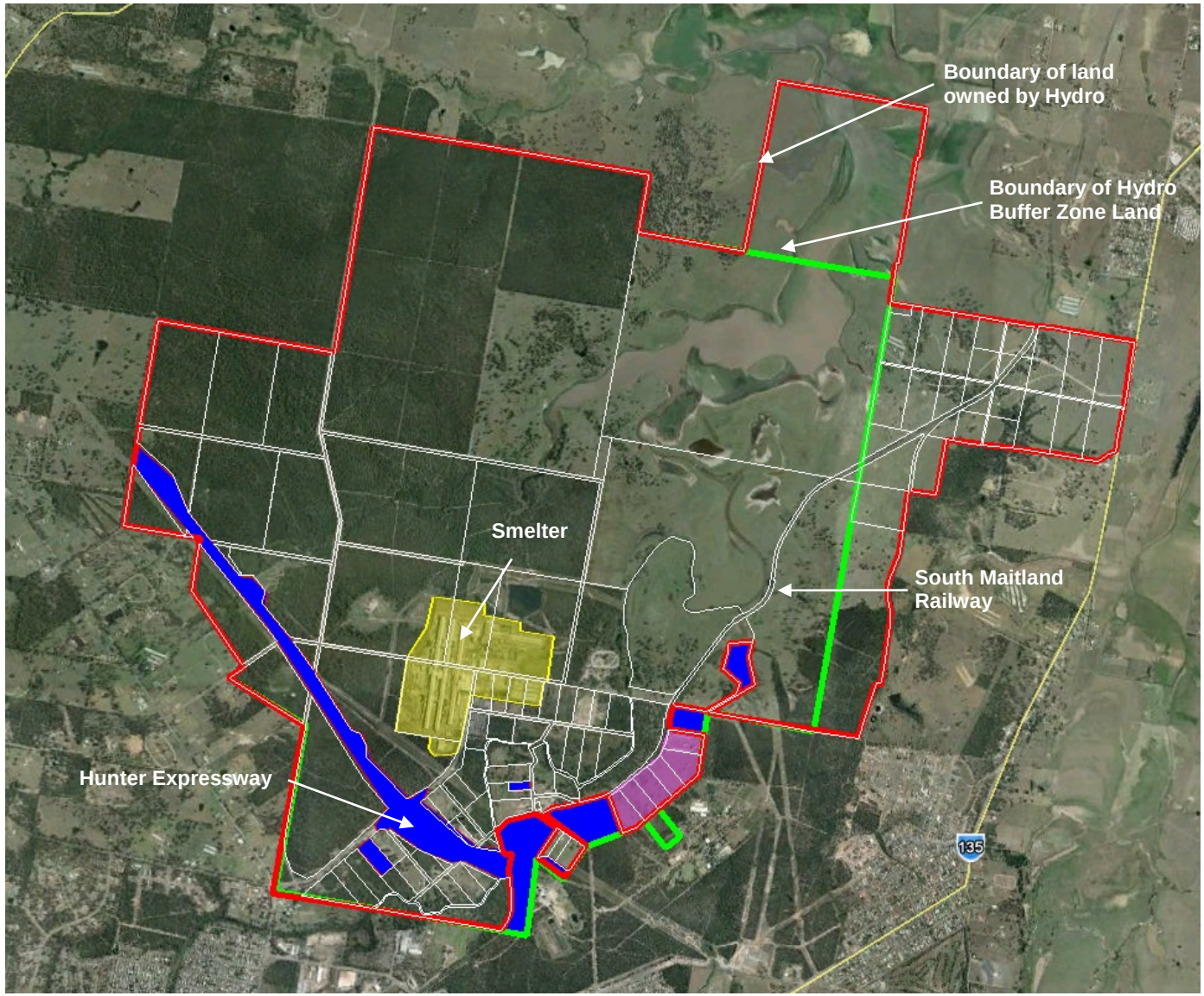
ENVIRON did not independently verify all of the written or oral information provided to ENVIRON during the course of this investigation. While ENVIRON has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided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

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

10.1 User Reliance

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

Figures



Google Earth Pro: Licence until 5/2/15.

Approximate Location of land owned by Hydro

Approximate Location of Buffer Zone

Land not owned by Hydro

Parcel 13

N

Hydro Aluminium Kurri Kurri – Phase 2 Environmental Site Assessment

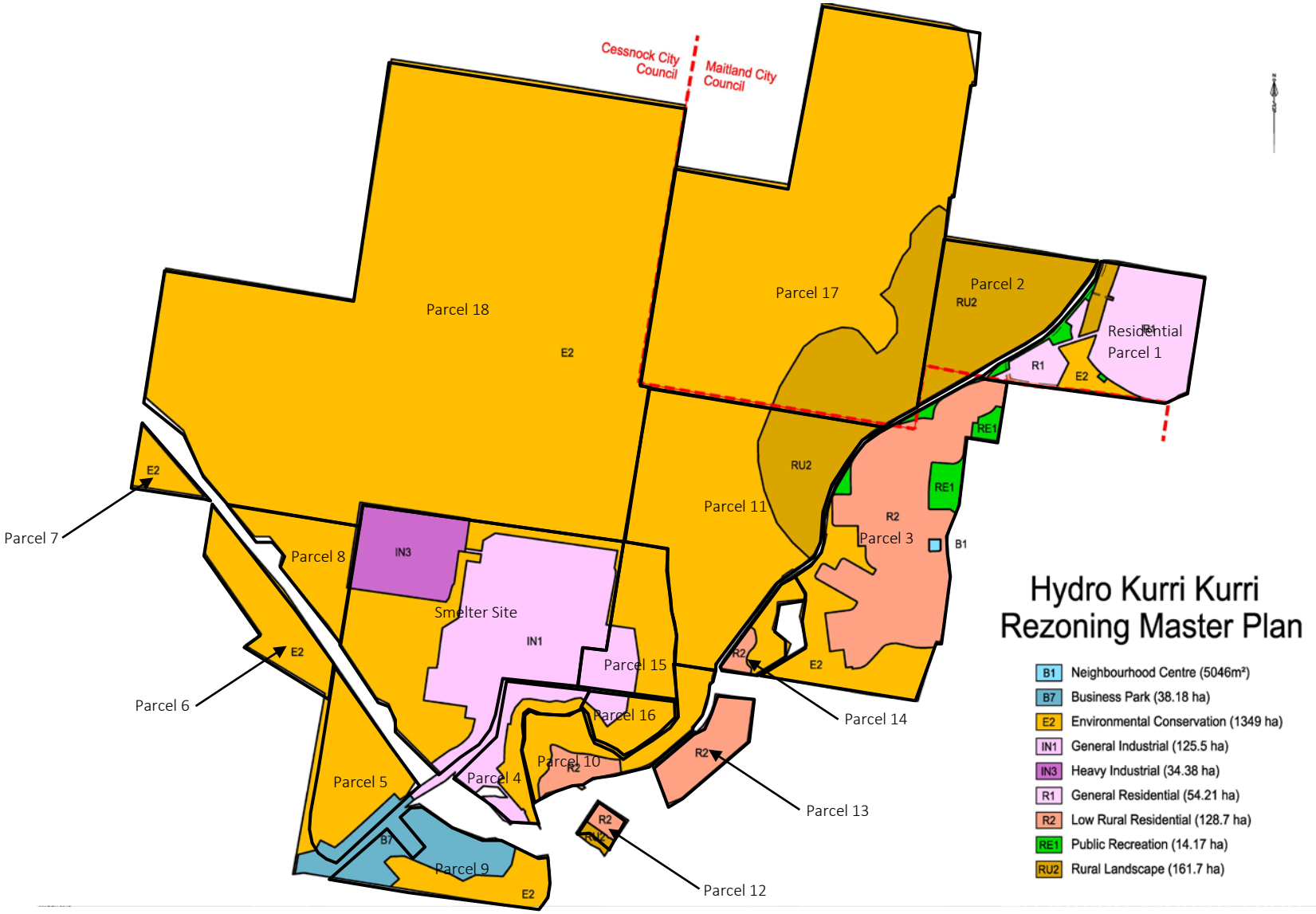
Parcel 13 - Site Location

ENVIRON

JOB NO: AS130348

DATE: March 2014

FIGURE 1



Proposed Land Zonings taken from
Hydro Kurri Kurri Preliminary Masterplan dated 26/3/15

Hydro Aluminium Kurri Kurri – Phase 2 Buffer Zone investigations

Land Parcels and Proposed Land Zoning

ENVIRON

JOB NO: AS 130348

DATE: March 2015

FIGURE 2

KEY:

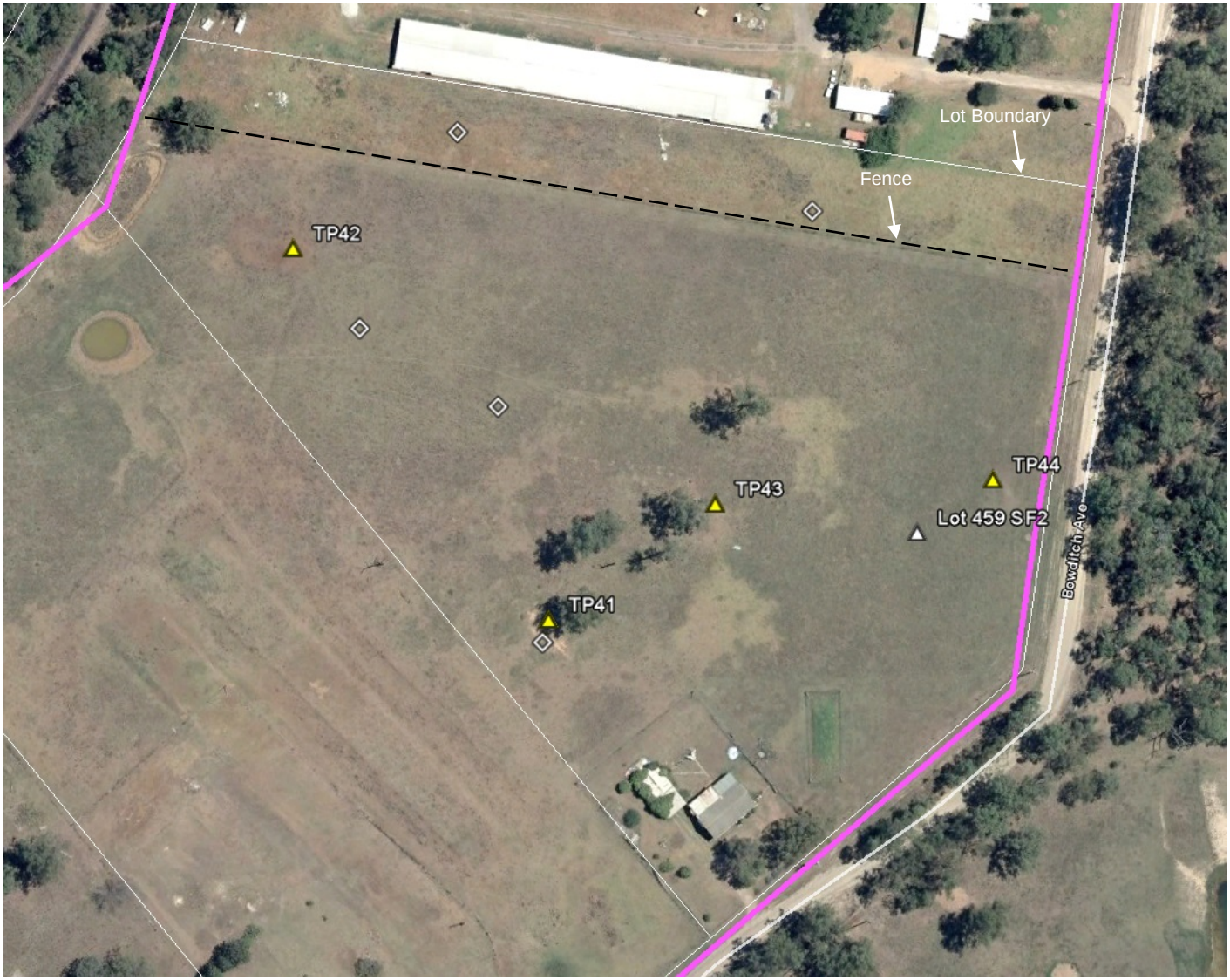
- Site Boundary
- SF Soil Sample for Fluoride Analysis
- ACM fragment
- Fill/ waste
- TP Test Pit

N

Google Earth Pro: Licenced til 5/2/15.

Hydro Aluminium Kurri Kurri – Phase 2 Environmental Site Assessment	Parcel 13 – Soil Sampling Locations at Lot 458

ENVIRON | JOB NO: AS130348 | DATE: March 2014 | FIGURE 3



KEY:

- Site Boundary
- △ SF — Soil Sample for Fluoride Analysis
- ◇ — Fill/ waste
- △ TP — Test Pits

N

Google Earth Pro: Licenced til 5/2/15.

Hydro Aluminium Kurri Kurri – Phase 2 Environmental Site Assessment	Parcel 13 – Soil Sampling Locations for Lot 459

ENVIRON

JOB NO: AS130348

DATE: March 2014

FIGURE 3

KEY:

- Site Boundary
- SF — Soil Sample for Fluoride Analysis
- ACM fragment
- Fill/ waste
- TP — Test Pits

N

Google Earth Pro: Licenced til 5/2/15.

Hydro Aluminium Kurri Kurri – Phase 2 Environmental Site Assessment

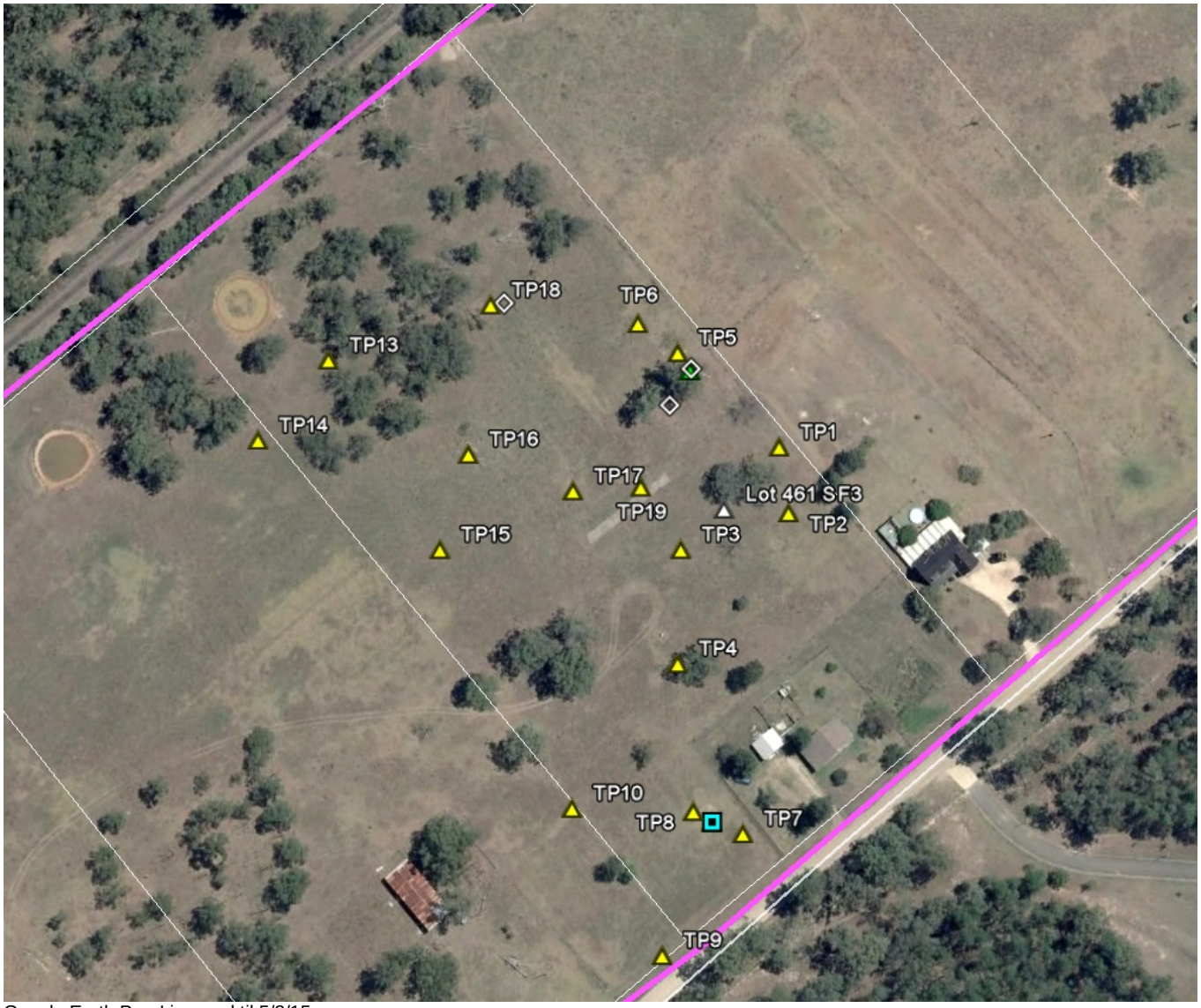
Parcel 13 – Soil Sampling Locations for Lot 460

ENVIRON

JOB NO: AS130348

DATE: March 2014

FIGURE 3



Google Earth Pro: Licenced til 5/2/15.

KEY:

- Site Boundary
- SF — Soil Sample for Fluoride Analysis
- ACM fragment
- Fill/ waste
- TP — Test Pits

N

Hydro Aluminium Kurri Kurri – Phase 2 Environmental Site Assessment	Parcel 13 – Soil Sampling Locations for Lot 461

ENVIRON | JOB NO: AS130348 | DATE: March 2014 | FIGURE 3

KEY:

- Site Boundary
- SF — Soil Sample for Fluoride Analysis
- ACM fragment
- Fill/ waste
- TP — Test Pits

N

Google Earth Pro: Licenced til 5/2/15.

Hydro Aluminium Kurri Kurri – Phase 2 Environmental Site Assessment	Parcel 13 – Soil Sampling Locations on Lot 462

ENVIRON | JOB NO: AS130348 | DATE: March 2014 | FIGURE 3

Google Earth Pro: Licenced til 5/2/15.

KEY:

- Site Boundary
- SF — Soil Sample for Fluoride Analysis
- Fill/ waste
- Building footprint
- TP — Test Pit

N

Hydro Aluminium Kurri Kurri – Phase 2 Environmental Site Assessment

Parcel 13 – Soil Sampling Locations for Lot 463

ENVIRON

JOB NO: AS130348

DATE: March 2014

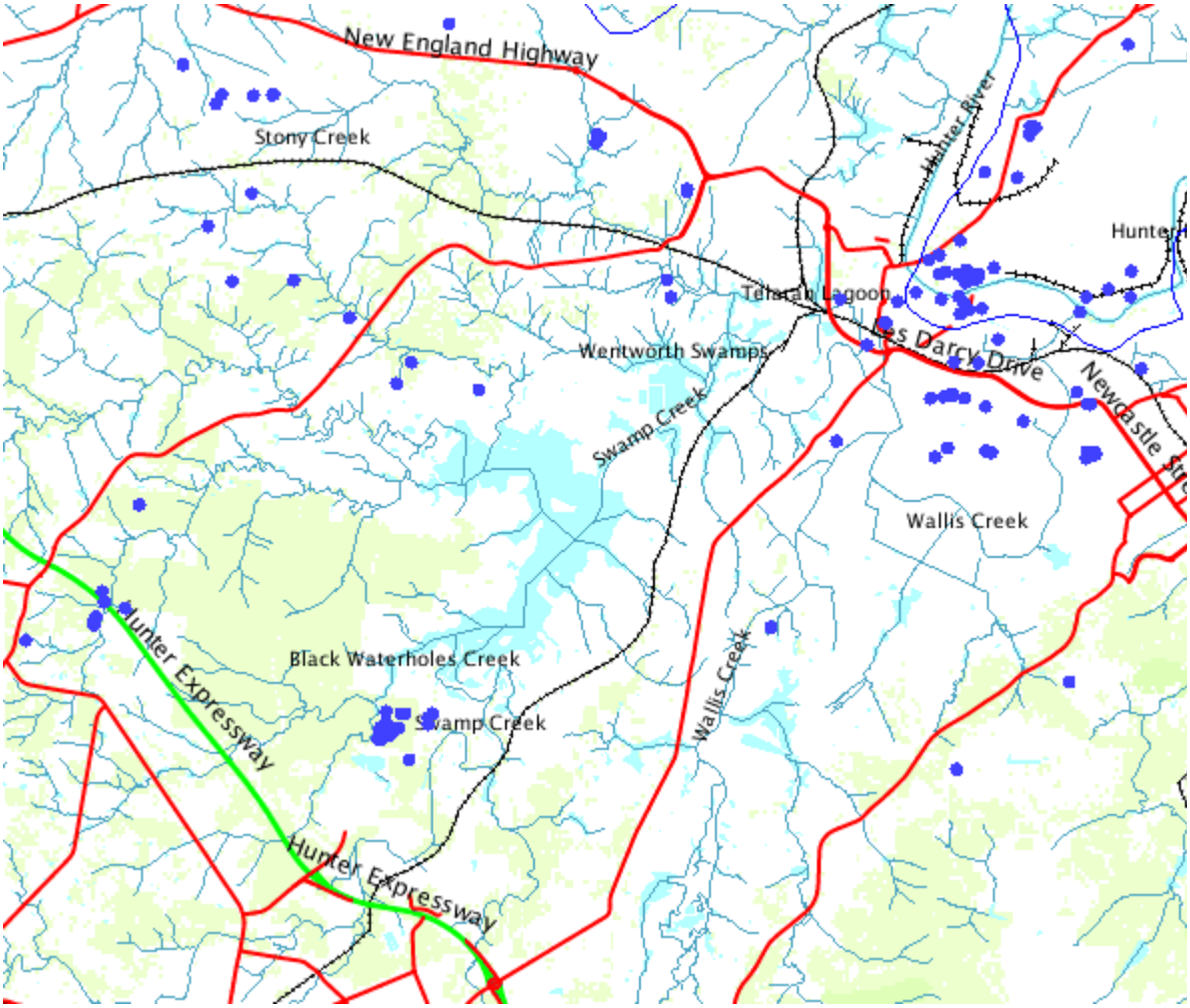
FIGURE 3

Appendix A

Surrounding Groundwater Bores

Groundwater Wells near Employment Land Subarea 11

Map created with NSW Natural Resource Atlas - http://www.nratlas.nsw.gov.au
Wednesday, January 08, 2014



0 15 Km

Legend

Symbol	Layer	Custodian
	Cities and large towns renderImage: Cannot build image from features	
Cowra	Populated places renderImage: Cannot build image from features	
	Towns	
	Groundwater Bores	
	Catchment Management Authority boundaries	
	Major rivers	

Topographic base map

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079088

Works Details (top)

GROUNDWATER NUMBER	GW079088
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371306.00
EASTING	358054.00
LATITUDE	32 47' 13"
LONGITUDE	151 29' 3"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079090

Works Details (top)

GROUNDWATER NUMBER	GW079090
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371368.00
EASTING	358105.00
LATITUDE	32 47' 11"
LONGITUDE	151 29' 5"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079092

Works Details (top)

GROUNDWATER NUMBER	GW079092
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371429.00
EASTING	358078.00
LATITUDE	32 47' 9"
LONGITUDE	151 29' 4"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079093

Works Details (top)

GROUNDWATER NUMBER	GW079093
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371460.00
EASTING	358078.00
LATITUDE	32 47' 8"
LONGITUDE	151 29' 4"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
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Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079094

Works Details (top)

GROUNDWATER NUMBER	GW079094
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371462.00
EASTING	358234.00
LATITUDE	32 47' 8"
LONGITUDE	151 29' 10"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
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Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079096

Works Details (top)

GROUNDWATER NUMBER	GW079096
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371707.00
EASTING	358152.00
LATITUDE	32 47' 0"
LONGITUDE	151 29' 7"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
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Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079097

Works Details (top)

GROUNDWATER NUMBER	GW079097
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371679.00
EASTING	358335.00
LATITUDE	32 47' 1"
LONGITUDE	151 29' 14"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079099

Works Details (top)

GROUNDWATER NUMBER	GW079099
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371003.00
EASTING	358448.00
LATITUDE	32 47' 23"
LONGITUDE	151 29' 18"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079101

Works Details (top)

GROUNDWATER NUMBER	GW079101
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371680.00
EASTING	358387.00
LATITUDE	32 47' 1"
LONGITUDE	151 29' 16"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079102

Works Details (top)

GROUNDWATER NUMBER	GW079102
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371685.00
EASTING	358725.00
LATITUDE	32 47' 1"
LONGITUDE	151 29' 29"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, January 6, 2014

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079103

Works Details (top)

GROUNDWATER NUMBER	GW079103
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	(Unknown)
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6371530.00
EASTING	358675.00
LATITUDE	32 47' 6"
LONGITUDE	151 29' 27"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Appendix B

Site Photographs

Photo 1: Photograph showing small fill stockpile and metal framing, with waste stockpile in the background, on Lot 458.

Photo 2: Photograph of the waste stockpile, including farming machinery, an Intermediate Bulk Container, 44 gallon drums and scrap metal on Lot 458.

Photo 3: Photograph showing small stockpile of fill material with ACM fragments on Lot 458.

Photo 4: Photograph of the residential property on Lot 460, facing east.

Photo 5: Photograph of a stockpile of building debris, including concrete and ACM fragments in foreground, on Lot 460.

Photo 6: Photograph of building debris on Lot 460.

Photo 7: Photograph of concrete slab for former building on Lot 461.

Photo 8: Photograph of concrete slabs for former building on Lot 461.

Photo 9: Photograph of debris on Lot 461, including rusted 44 gallon drum.

Photo 10: Photograph of the general site at Lot 462, facing east.

Photo 11: Photograph of concrete building rubble on Lot 462, with an old shed in the background.

Photo 12: Photograph of old tyres on Lot 462.

Photo 13: Photograph of a drainage line on Lot 463.

Photo 14: Photograph of concrete building debris on Lot 463.

Photo 15: Photograph of a dam on the western boundary of Lot 463, facing west. Note the coal train line in the background (western site boundary).

Appendix C

Field Information Sheets

Site Walkover Checklist

Project No.: AS130348	**Date and Time:** 25/10/13
Land Parcel: ELP 13	**Weather:** fine, warm
Lot and DP: lot 463	**Environ Personnel:** KW

Site Description	
Topography	flat near the road & gentle slope to rail at rear of property
Surface Geology	
Fill evident?	yes → former poultry shed footprint is filled with gravel & concrete & metal pipes
Hummocky ground?	yes - back of property, immediately behind dam - small fill mounds (1) metal vehicle parts evident
Structures on site?	house - occupied
Location of structures	as per map - dam, footprint, drainage line
Building materials used in structures	asbestos used in former poultry sheds
Asbestos debris on site?	possibly, fragments from 10x10 submit for analysis
Location of asbestos debris?	-
Volume of asbestos debris?	-

GPS Locations of Interest		
Point of Interest	Easting	~~Northing~~ S
small fill mounds (1)	151.49029	32.79654
drainage line - scrap metal visible on surface	151.49059	32.79645
former poultry shed 10x10m (1st footprint) mid point	151.49121°E	32.79790°S 5m accuracy
small rubble mounds (2)	151.49147	32.79727

Description of Photographs Taken

former poultry shed footprint → thick grass cover, some small areas of exposed ground
drainage line
dam
fill mounds (1) - metal machine parts visible, grass covered
fill mounds (2) — reo concrete pieces on surface, bricks
very close to other hummocky ground
potential for top part of drainage line to be filled?

Miscellaneous Field Comments

1 x 10m x 10m on former poultry sheds footprint
↓
metal pipes still in place
small amount building debris visible on surface - scrap metal concrete pieces

1 x ~~Dup~~ fluoride sample
↓
E S
151.49125°E 32.79722°S
5m accuracy
→ silt, dark brown, smoist, topsoil

→ strip of land between 2 footprints (former driveway?) is also fill with sheet metal, concrete bricks visible on surface

Site Walkover Checklist

Project No.:	AS130348	**Date and Time:**	25/10/13
Land Parcel:	ELP 13	**Weather:**	fine, warm
Lot and DP:	Lot 462	**Environ Personnel:**	KW

Site Description

Topography	flat near Rd & gentle slope to railway at rear
Surface Geology	
Fill evident?	yes, infront of 2nd dam at property rear & behind dam on near fenceline (old fence posts & wire)
Hummocky ground?	
Structures on site?	1 old shed near the road
Location of structures	
Building materials used in structures	appears to be scattered over the site of the fenced house lot.
Asbestos debris on site?	yes although material scattered in and around shed is very difficult to break & may be fibro (no Asbestos)
Location of asbestos debris?	See below
Volume of asbestos debris?	Scattered around the site → concentrated on old building footprints potentially buried onsite.

GPS Locations of Interest

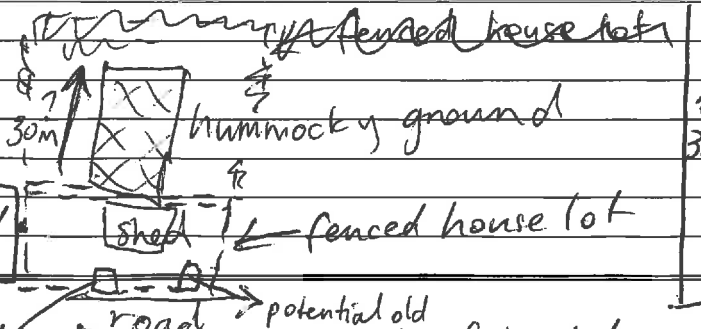
Point of Interest	Easting	Northing	
(1) fill mounds (potential) timber & gravelly soil exposed	151.49160	32.79618	
old fence posts & wire	151.49130	32.79568	4m accur.
treed area - old tyres & scrap metal	151.49173	32.79560	5m accuracy
hummocky ground (diff grass cover)	151.49206	32.79649	

Description of Photographs Taken

old fence posts & wire
fill mound (1)
treed area - old tyres / scrapmetal → bricks - near 3rd dam (between 2nd & 3rd dam)
hummocky ground behind old shed (diff: grass cover) → extends to immediately behind shed where surface sheet metal & concrete footings visible
in and around the old shed (ACM2) → E 151.49246 S 32.79708 4m accuracy
old building footprint ACM3
potential old building footprint/garden bed ACM4

Miscellaneous Field Comments

fenced house lot with old shed on it has evidence of filled ground & demolition rubble across the site including potential ACM fragments



ACM3 → old building footprint → S 32.79758

ACM4 → old garden bed → E 151.49301 S 32.79729 → 5m accuracy

ENVIRON

Site Walkover Checklist

Project No.:	AS 130348	**Date and Time:**	25/10/13
Land Parcel:	ELP 13	**Weather:**	
Lot and DP:	Lot 461	**Environ Personnel:**	KW

Site Description

Topography	as per other lots along this Rd.
Surface Geology	
Fill evident?	yes across the front portion of the site
Hummocky ground?	yes front portion
Structures on site?	house + former building footprints x3 (BFP)
~~Location of structures~~	F sample SF3 S – 32.79601° E – 151.49353 topsoil brown, silt, dry
Building materials used in structures	
Asbestos debris on site?	yes former building footprints x2 BFP(2) & BFP(3)
Location of asbestos debris?	ACM scattered across long slab ~~Sml amount of ACM~~ → ~~small~~ Scattered across the small Concrete slab → lots of it & grass surrounding slab may hide alot.
Volume of asbestos debris?	Sml sample collected for ID purposes

GPS Locations of Interest

Point of Interest	Easting	Northing
Fill (1) – metal pipe visible, Sml mound →	151.49281E	32.79548°S
Building FP (1) & fill →	151.49342E	32.79563°S
Fill (2) – under tree – old fence post visible partially buried.	151.49335	32.79573
	→ 151.49338	32.79887°S

Description of Photographs Taken * BFP(2) & nearby fill → ACM(2) – ~~sml visible piece collected~~ sample of spread collected

BFP(1) & fill – metal sheet, old drum, ceramic water pipe/pit
no ACM sighted → need 10x10 on footprint?
BFP(2) & nearby fill (at both ends of BFP2) & Sml mound to the rear of it
→ old metal pipes visible in mounds
→ other hummocky ground to the rear of BFP2
BFP(3) & nearby grassed fill mound → bricks & concrete pieces visible also concrete slab may be only part of BFP → other parts covered by thick grass?
ACM covering all visible BFP slab
↓ slab is bathroom only? → ground pipe fitting sighted

Miscellaneous Field Comments

old fence posts & wire 151.49284°E 32.79587°S
surface debris
Hummocky ground immediately rear of current house, bricks & concrete pieces visible
*151.49367E 32.79614°S
& *151.49334 32.79647
Hummocky ground (Strip of) at front portion of lot → 151.49319°E 32.79693°S

BFP(3) → 151.49349°E, 32.79686°S
↓
ACM(1) → Sample of spread collected

Site Walkover Checklist

Project No.:	AS130	**Date and Time:**	30/10/13
Land Parcel:	ELP130348	**Weather:**	cloudy, sunny, cool breeze
Lot and DP:	Lot 460	**Environ Personnel:**	KW

Site Description

Topography	front of property - slight slope towards Rd, back of property - slight slope to rail line at rear of property.
Surface Geology	-
Fill evident?	yes poultry sheds & footprints & building footprint on house lot are built up areas & fill at front
Hummocky ground?	yes back & front of property
Structures on site?	neighbour mentioned transpiration pit at front of property → photo taken → soft ground very wet very green
Location of structures	-
Building materials used in structures	—
Asbestos debris on site?	fill exposed on building footprint on house lot contains asbestos → whole around may contain subsurface asbestos?
Location of asbestos debris?	-
Volume of asbestos debris?	-

32.79548 151.49381°E

GPS Locations of Interest

Point of Interest	Easting	Northing
Med fill mound near dams at rear of lot (Soil only → appears to be)	151.49354	32.79431
Hummocky ground (1) at rear of poultry sheds	151.49366	32.79481
Hummocky ground (2) at front of lot	151.49484	32.79578

Description of Photographs Taken

* Hummocky ground (1) at rear of former poultry sheds bricks & concrete pieces visible on the surface
* former building footprint immediately behind house on house lot is built up above ground level & is level ground → All debris visible at rear corners of footprint → Asbestos sheets here - med - large fragments
* Hummocky ground (2) at front of lot, immed. in front of 2nd poultry shed footprint surface (bricks & concrete pieces) debris visible - some concrete slab exposed but mostly grassed very wet

Miscellaneous Field Comments

min. surface debris on the former poultry shed footprints (elevated above ground level) → well grassed over all building footprints, sparse bare patches

10x10 grid mid pt on one poultry shed footprint - nothing found

S 32.79541 E 151.49444

F sample taken (SF1) - 32.79475°S
topsoil, silt, brown 151.49388°E
Smoist, some small gravel pieces & grass roots 0.01-0.02m

Site Walkover Checklist

Project No.:	AS130848	**Date and Time:**	30/10/13
Land Parcel:	ELP13	**Weather:**	as per Lot 460
Lot and DP:	lot 459	**Environ Personnel:**	KW

Site Description

Topography	as per lot 460
Surface Geology	
Fill evident?	yes
Hummocky ground?	yes
~~Structures~~ on site?	↑
Location of structures	house onsite, near road
Building materials used in structures	
Asbestos debris on site?	yes on house lot – old shed footprint
Location of asbestos debris?	"
Volume of asbestos debris?	Scattered all over footprint
topsoil, sandy silt brown moist	← F – Sample taken SF2 – 151.49591°E 32.79487°S

GPS Locations of Interest

Point of Interest	Easting	~~Northing~~ S
diff ground cover & hummocky area	151.49396	32.79419
Small fill mound s(1) grass covered	151.49429	32.79438
long area – diff grass cover & slightly hummocky	151.49412	32.79476
old roof tiles – stacked →	near ~~roof~~ here	

Description of Photographs Taken

distinct fill ~~mon~~ mounds – immed. rear of house → 151.49482°E
Small fill mounds (2) – ~100m rear of house 32.79514°S
→ 151.49469°E
32.79457°S
diff. grass cover (3) & hummocky area → 151.49511°E
→ some surface concrete pieces 32.79484°S
& metal scrap visible here (~~roof~~ corrugated sheet)

Miscellaneous Field Comments

old water pipe still in ground near lot 458 fence & front of lot 459 (near road) → 151.49612°E
~~32~~ 32.79465°S

near fill mound → 151.49616°E
old vege patch? 32.79477°S
→ 32.79527°S
151.49563°E

~~F Sample taken SF3 32.79585°S 151.49504°E topsoil, dark brown moist, silt, grass roots~~

House lot – former Shed footprint → ACM fragments scattered & old timber & metal fence
ACM 1 32.79557°S 151.49504°E

\\Auhunfp1.environcorp.int\shared_files\Projects\Hydro Australia\Site Walkover Checklist.doc

ENVIRON

Site Walkover Checklist

Project No.:	AS130348	**Date and Time:**	30/10/13
Land Parcel:	ELP 13	**Weather:**	fine, cloudy
Lot and DP:	Lot 458	**Environ Personnel:**	KW

Site Description

Topography	gentle slope to road at front & gentle slope to rail line at rear
Surface Geology	
Fill evident?	yes
Hummocky ground?	
Structures on site?	yes 2 current poultry sheds, house asbestos sheet visible on poultry sheds
Location of structures	① old, former poultry shed gone & newer one built as per aerials
Building materials used in structures	asbestos in older sheds
Asbestos debris on site?	yes
Location of asbestos debris?	see below
Volume of asbestos debris?	unknown as possibly buried

F sample taken (SF3) -32.79400°S 151.49641°E ← 0.01-0.02m topsoil sandy silt brown, moist

GPS Locations of Interest

Point of Interest	Easting	~~Northing~~ S
fill ①? small mound	151.49560°E	32.79409°S
fill ② " "	151.49457°E	32.79390°S
hummocky ① (H1) – & surface debris	151.49440°E	32.79351°S
② H2 & fill ③ mid-mound →	151.49404	32.79337°S

Description of Photographs Taken

H1 & surface debris - near rear fence of property near soil mounds & old metal structure frames, old tyres, timber, chemical drums (fuel?) plastic industrial chemical container

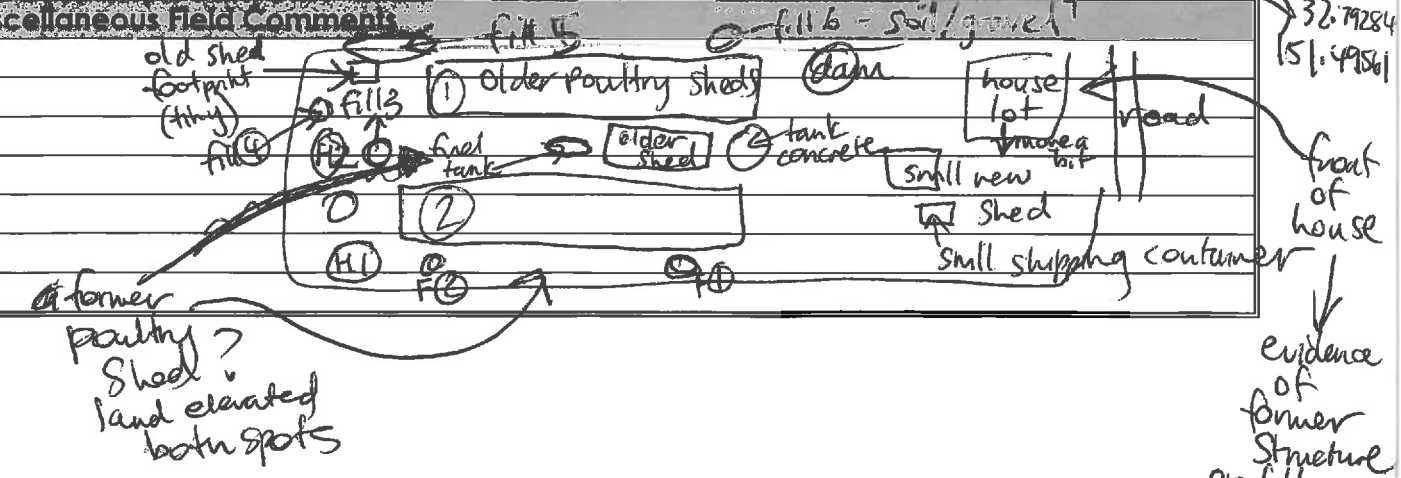
H2 & fill 3 " "

fill 4 - buried & surface ACM (Sample ACM1) → 151.49417°E 32.79304°S

fill 5 - grassed mounds → 151.49434°E 32.79269°S

fill 6 - farm & related? → 32.79284 151.49561

Miscellaneous Field Comments



Appendix D

Results Tables

TABLE A: Soil Analytical Results - Grid Sampling

Sample Depth: 0.0m - 0.01m

Sampling Date: 30/10/13

Laboratory PQL: 0.5 mg/kg

Site Specific HIL - Fluoride: 440mg/kg

Sample Identification	Soluble Fluoride mg/kg (1:5 soil:water)
Lot 458 SF3	7
Lot 459 SF2	10
Lot 460 SF1	1
Lot 461 SF3	6
Lot 462 SF2	8
Lot 463 SF1	7

TABLE B: Soil Analytical Results - Intrusive Investigations

Sample Identification	PQL	Guideline					Lot 463 TP1	Lot 463 TP4	Lot 463 TP7	Lot 463 TP7	Lot 463 TP9	Lot 462 TPC	Lot 462 SP3	Lot 460 TP4	Lot 460 TP8	Lot 459 TP11	Lot 459 TP12	Lot 458 TP16	Lot 458 TP19	Lot 458 TP23	Lot 463 TP1	Lot 463 TP3	Lot 463 TP4	Lot 463 TP5
Sample Depth (m)							0.2-0.3	0.6-0.7	0.0-0.3	1.0-1.1	0.5-0.6	0.3-0.5									0.2-0.3	0.8-0.9	0.6-0.7	1.1-1.3
Date		HIL 'A' [A]	HSL 'A' Sand 0m to 1m	EIL Residential [B]	ESL Residential (Coarse Soil)	Mgt Limits Residential	20/03/2014	20/03/2014	21/03/2014	21/03/2014	21/03/2014	21/03/2014	21/03/2014	31/03/2014	31/03/2014	31/03/2014	31/03/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014
Sample Profile							FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
Sample collected by							KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
Metals																								
Arsenic	5	100		100			9	9	12	15	10	9	10	8	14	14	18	<5	<5	15	9		9	
Cadmium	1	20					<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1		<1	
Chromium	2	100		410			66	16	7	32	17	9	15	27	31	12	23	9	5	10	66		16	
Copper	5	6000		220			20	9	52	<5	<5	15	24	<5	8	14	22	<5	<5	34	20		9	
Nickel	5	400		220			36	16	22	11	11	38	57	14	16	13	56	12	9	17	36		16	
Lead	2	300		1100			3	7	31	<2	3	5	4	4	4	6	13	5	5	6	3		7	
Zinc	5	7400		630			52	515	24	6	30	122	445	362	119	283	535	160	130	362	52		515	
Marcury	0.1	10					<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	
Polycyclic Aromatic Hydrocarbons (PAH)																								
Naphthalene	0.1			170			<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	
Acenaphthylene	0.1						<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	
Acenaphthene	0.1						<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	
Fluorene	0.1						<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	
Phenanthrene	0.1						0.7	<0.5	1.7	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.7		<0.5	
Anthracene	0.1						<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	
Fluoranthene	0.1						1.1	<0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	1.1		<0.5	
Pyrene	0.1						1.1	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	1.1		<0.5	
Benz(a)anthracene	0.1						0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.7		<0.5	
Chrysene	0.1						0.8	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.8		<0.5	
Benzo(b)&(k)fluoranthene	0.2						1.2	<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		<0.5	
Benzo(a) pyrene	0.05				0.7		0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.6		<0.5	
Indeno(1,2,3-c,d)pyrene	0.1						0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.9		<0.5	
Dibenz(a,h)anthracene	0.1						0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.6		<0.5	
Benzo(g,h,i)perylene	0.1						<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	
Benzo(a)pyrene TEQ	0.5	3					1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.8		<0.5	
Total +ve	--	300					8.5	<0.5	4.1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	8.5		<0.5	
Total Recoverable Hydrocarbons (TRH) - NEPM (2013)																								
TRH C6 - C10	25		45		180	700	<25	<25	<10	<25	<25	<25	<25	<25		<25	<25	<25	<25	<25	<10		<10	
vTPH C6 - C10 less BTEX	25		45		-	-	<25	<25	<10	<25	<25	<25	<25	<25		<25	<25	<25	<25	<25	<50		<50	
TRH >C10-C16	50		110		120	1000	<50	<50	170	<50	<50	<50	<50	<50		<50	<50	<50	<50	<50	<100		<100	
TRH >C16-C34	100		NL		300	2500	<100	<100	1080	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100		<100	
TRH >C34-C40	100		NL		2800	10,000	<100	<100	240	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<50		<50	
BTEX																								
Benzene	0.2		0.5		50		<0.2	<0.2	<0.2	<0.2	<0.2	<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		160		85		<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	
Ethylbenzene	1		35		70		<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	
m+p-xylene	2		40		105		<2	<2	<2	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	
o-Xylene	1		40				<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	
OC/ OP Pestcides																								
Sum of Aldrin + Dieldrin	0.05	6					<0.05	<0.05	<0.05	<0.05			<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05
Sum of DDD + DDT + DDE	0.05	240					1.13	<0.05	<0.05	<0.05			0.45	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05
Remainder of OCPs	0.05						<0.05	<0.05	<0.05	<0.05			<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05
OPPs	0.05						<0.05	<0.05	<0.05	<0.05			<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05

All results are in mg/kg

[A] HIL A - Residential landuse

[D] EILs represent the most conservative value possible as the lowest value for added contaminant limit (ACL) was used, irrespective of soil properties and ambient background concentration.

Results shaded grey are in excess of the investigation criteria.

Benzo(a)pyrene TEQ is indicative of carcinogenic PAHs: the HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008. The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF and summing these products.

TABLE B: Soil Analytical Results - Intrusive Investigations

Sample Identification	PQL	Guideline				Lot 463 TP7	Lot 463 TP7	Lot 463 SP2	Lot 463 TP9	Lot 462 TPA	Lot 462 TPC	Lot 462 TP10	Lot 4632 SP3	Lot 462 TP Gully
Sample Depth (m)						0-0.3	1-1.1		0.5-0.6	0.3-0.5	0.3-0.5	0-0.3		
Date		HIL 'A' [A]	HSL 'A' Sand 0m to 1m	EIL Residential [B]	ESL Residential (Coarse Soil)	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014
Sample Profile						FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
Sample collected by						KW	KW	KW	KW	KW	KW	KW	KW	KW
Metals														
Arsenic	5	100		100		12	15	15		10		9		10
Cadmium	1	20				<1	<1	<1		<1		<1		<1
Chromium	2	100		410		7	32	32		17		9		15
Copper	5	6000		220		52	<5	<5		<5		15		24
Nickel	5	400		220		22	11	11		11		38		57
Lead	2	300		1100		31	<2	<2		3		5		4
Zinc	5	7400		630		24	6	6		30		122		445
Marcury	0.1	10				<0.1	<0.1	<0.1		<0.1		<0.1		<0.1
Polycyclic Aromatic Hydrocarbons (PAH)														
Naphthalene	0.1			170			<0.5	<0.5	<0.5		<0.5		<0.5	
Acenaphthylene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Acenaphthene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Fluorene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Phenanthrene	0.1						1.7	<0.5	<0.5		<0.5		<0.5	
Anthracene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Fluoranthene	0.1						1	<0.5	<0.5		<0.5		<0.5	
Pyrene	0.1						0.8	<0.5	<0.5		<0.5		<0.5	
Benz(a)anthracene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Chrysene	0.1						0.6	<0.5	<0.5		<0.5		<0.5	
Benzo(b)&(k)fluoranthene	0.2						<0.5	<0.5	<0.5		<0.5		<0.5	
Benzo(a) pyrene	0.05				0.7		<0.5	<0.5	<0.5		<0.5		<0.5	
Indeno(1,2,3-c,d)pyrene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Dibenz(a,h)anthracene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Benzo(g,h,i)perylene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Benzo(a)pyrene TEQ	0.5	3					<0.5	<0.5	<0.5		<0.5		<0.5	
Total +ve	--	300					4.1	<0.5	<0.5		<0.5		<0.5	
Total Recoverable Hydrocarbons (TRH) - NEPM (2013)														
TRH C6 - C10	25		45		180	<10	<25		<25		<25		<25	
vTPH C6 - C10 less BTEX	25		45		-	100	<25		<25		<25		<25	
TRH >C10-C16	50		110		120	840	<50		<50		<50		<50	
TRH >C16-C34	100		NL		300	440	<100		110		<100		<100	
TRH >C34-C40	100		NL		2800	1380	<100		110		<100		<100	
BTEX														
Benzene	0.2		0.5		50		<0.2		<0.2		<0.2		<0.2	
Toluene	0.5		160		85		<0.5		<0.5		<0.5		<0.5	
Ethylbenzene	1		35		70		<1		<1		<1		<1	
m+p-xylene	2		40		105		<2		<2		<2		<2	
o-Xylene	1		40				<1		<1		<1		<1	
OC/ OP Pestcides														
Sum of Aldrin + Dieldrin	0.05	6					<0.05		<0.05				<0.05	
Sum of DDD + DDT + DDE	0.05	240					<0.05		<0.05				<0.05	
Remainder of OCPs	0.05						<0.05		<0.05				<0.05	
OPPs	0.05						<0.05		<0.05				<0.05	

All results are in mg/kg

[A] HIL A - Residential landuse

[D] EILs represent the most conservative value possible as the lowest value for added contaminant limit (ACL) was use

Results shaded grey are in excess of the investigation criteria.

Benzo(a)pyrene TEQ is indicative of carcinogenic PAHs: the HIL is based on the 8 carcinogenic PAHs and their TEFs

TABLE C: Soil Quality Assurance/ Quality Control Results						
Sample Identification		QA1	RPD %		QA1	RPD %
Sample Depth (m)	Fill soil matrix			Fill soil matrix		
Duplicate Type	Intralaboratory			Intralaboratory		
Sample Profile	FILL			FILL		
Sample collected by	KW			KW		
Metals						
Arsenic	<5	5	NC	<5	5	NC
Cadmium	<1	<1	NC	<1	<1	NC
Chromium	7	13	60	7	13	60
Copper	16	23	36	16	23	36
Lead	<5	6	NC	<5	6	NC
Nickel	4	8	67	4	8	67
Zinc	31	32	3	31	32	3
Mercury	0.2	0.3	40	0.2	0.3	40
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	<0.5	<0.5	NC	<0.5	<0.5	NC
Acenaphthylene	<0.5	<0.5	NC	<0.5	<0.5	NC
Acenaphthene	<0.5	<0.5	NC	<0.5	<0.5	NC
Fluorene	<0.5	<0.5	NC	<0.5	<0.5	NC
Phenanthrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Anthracene	<0.5	<0.5	NC	<0.5	<0.5	NC
Fluoranthene	<0.5	<0.5	NC	<0.5	<0.5	NC
Pyrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benz(a)anthracene	<0.5	<0.5	NC	<0.5	<0.5	NC
Chrysene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(b)&(k)fluoranthene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(a) pyrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Indeno(1,2,3-c,d)pyrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Dibenz(a,h)anthracene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(g,h,i)perylene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(a)pyrene TEQ	<0.5	<0.5	NC	<0.5	<0.5	NC
Total +ve	<0.5	<0.5	NC	<0.5	<0.5	NC
Total Recoverable Hydrocarbons (TRH) - NEPM (2013)						
TRH C6 - C10	<25	<25	NC	<25	<25	NC
vTPH C6 - C10 less BTEX	<25	<25	NC	<25	<25	NC
TRH >C10-C16	<50	<50	NC	<50	<50	NC
TRH >C16-C34	<100	<100	NC	<100	<100	NC
TRH >C34-C40	<100	<100	NC	<100	<100	NC
BTEX						
Benzene	<0.2	<0.2	NC	<0.2	<0.2	NC
Toluene	<0.5	<0.5	NC	<0.5	<0.5	NC
Ethylbenzene	<1	<1	NC	<1	<1	NC
m+p-xylene	<2	<2	NC	<2	<2	NC
o-Xylene	<1	<1	NC	<1	<1	NC

Note all units in mg/kg

BOLD identifies where RPD results

intralaboratory	interlaboratory		interlaboratory	
>50	>60	where both sample results e	>60	where both sample results exceed ten x P
>75	>85	where both sample results a	>85	where both sample results are within 5 to
>100	>100	where both sample results a	>100	where both sample results are within 2 to
AD>2.5 * PQL		where one or both sample results are <2 x		where one or both sample results are <2 x

BOLD identified where blanks >0

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

TABLE C: Soil Analytical Results - Asbestos

	Asbestos Detection		Asbestos Quantification					
Sample Identification	Asbestos Type	Description	Weight for ca kg	ACM g	Fibrous Asbes g	ACM >7mm %	AF/FA <7mm %	Trace Asbestos Detected Fibres
Lot 460 TP1	No							
Lot 460 TP2	No							
Lot 460 TP3	No							
Lot 460 TP4	No							
Lot 460 TP8	No							
Lot 459 TP11	No							
Lot 459 QA1	No							
Lot 459 TP12	No							
Lot 458 TP16	Yes	Ch + Cr						
Lot 458 TP17	No							
Lot 458 QA2	No							
Lot 458 TP19	No							
Lot 458 TP23	Yes	Ch						
Lot 459 TP27	No							
Lot 459 TP28	No							
Lot 459 TP29	No							
Lot 459 TP30	No							
Lot 459 TP31	No							
Lot 459 TP32	No							
Lot 459 TP33	No							
Lot 459 TP34	No							
Lot 459 TP35	No							
Lot 459 TP36	Yes	Ch						
Lot 459 TP37	No							
Lot 459 TP38	No							
Lot 463 TP1	Yes	Ch + Cr						
Lot 463 TP3	No							
Lot 463 TP5	No		0.25	<0.1	<0.02	<0.01	<0.001	No
Lot 463 TP7 0-0.3m	Yes	Am + Cr						
Lot 463 TP7 1-1.1m	No		0.04	<0.1	<0.002	<0.04	<0.005	No
Lot 463 QA1	No							
Lot 463 SP2	No							
Lot 463 TP9	No							
Lot 462 TPA	No		0.0716	<0.1	<0.002	<0.02	<0.003	No
Lot 462 TPB	No		0.309	<0.1	<0.002	<0.01	<0.001	Mo
Lot 462 TPC	No							
Lot 462 TP10	No		0.0524	<0.1	<0.002	<0.03	<0.004	No
Lot 462 TPE	No		0.296	<0.1	<0.002	<0.01	<0.001	No
Lot 462 SP3	Yes	Ch	0.35	<0.1	<0.002	<0.01	<0.001	No
Lot 462 TP Gully	Yes	Ch + Am + Cr						
Lot 462TP4	Yes	Ch + Am + Cr						
Lot 462TP3	Yes	Am + Cr						
Lot 463 TP2	No		0.0732	<0.1	<0.002	<0.02	<0.003	No
Lot 463 TP3	No		0.305	<0.1	<0.002	<0.01	<0.001	No

Appendix E

Laboratory Reports

11/11/13

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd Smithfield NSW 2176 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd Wmabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsglobal.com
☐ Melbourne: 2-4 Westall Rd Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ 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: ENVIRON	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☑ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? Yes No N/A
OFFICE: The Junction		☐ Non Standard or urgent TAT (List due date):	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT: AS130348 PROJECT NO.:	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	OF: 1 2 3 4 5 6 7	Other comments:
PROJECT MANAGER: Steve Cadman - CONTACT PH: 0249625444			
SAMPLER: Kate Woods SAMPLER MOBILE:	RELINQUISHED BY: Kate Woods	RECEIVED BY: KA	RELINQUISHED BY: KA
COC Emailed to ALS? (YES (NO) EDD FORMAT (or default):	DATE/TIME: 9:55am 4/11/13	DATE/TIME: 4/11/13 0955	DATE/TIME: 4/11/13 1700
Email Reports to (will default to PM if no other addresses are listed): scadman@environcorp.com			RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): "			DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Asbestos @ EN

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Asbestos ID only	Soluble Fluoride							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	ELP13 Lot 460 ACM1	30/10/13	S	unpreserved ziplock	1	X								log as EA2003
2	ELP13 lot 459 ACM1	30/10/13			1	X								
3	ELP13 Lot 461 ACM2	25/10/13			1	X								
~~STD~~ 4	ELP13 Lot 462 ACM2	25/10/13			1	X								
5	ELP13 Lot 462 ACM1	25/10/13			1	X								
6	ELP13 lot 463 ACM1	25/10/13			1	X								
7	ELP13 Lot 458 ACM1	30/10/13			1	X								
8	ELP13 Lot 461 SF3	25/10/13	S	unpreserved paper	1		X							
9	ELP13 Lot 463 SF1	25/10/13	S		1		X							
10	ELP13 Lot 462 SF2	25/10/13	S		1		X							
11	ELP13 Lot 458 SF3	30/10/13	S	unpreserved glass	1		X							
12	ELP13 Lot 459 SF2	30/10/13	S		1		X							
				TOTAL	12	7	5							

Environmental Division
Sydney
Work Order
ES1323625

Telephone : +61-2-8784 8555

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney 277 Woodpark Rd Smithfield NSW 2176 Ph 02 8784 8555 E samples.sydney@alsenviro.com
Brisbane 32 Shand St, Stafford QLD 4053 Ph 07 3243 7222 E samples.brisbane@alsenviro.com
Melbourne 2-4 Westall Rd Springvale VIC 3171 Ph 03 8549 9600 E samples.melbourne@alsenviro.com
Perth 10 Hod Way, Malaga WA 6090 Ph 08 9209 7655 E samples.perth@alsenviro.com
Newcastle: 5 Rosegum Rd Wasabrook NSW 2304 Ph 02 4968 9433 E samples.newcastle@alsenviro.com
Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph 07 4796 0600 E townsville.environmental@alsenviro.com
Adelaide: 2-1 Burma Rd Pooraka SA 5095 Ph 08 8359 0890 E adelaide@alsenviro.com
Launceston: 27 Wellington St, Launceston TAS 7250 Ph 03 6331 2158 E launceston@alsenviro.com

CLIENT: ENVIRON	TURNAROUND REQUIREMENTS: ☑ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: The Junction	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: AS130348 PROJECT NO.:	ALS QUOTE NO.:	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: Steve Cadman CONTACT PH: 0249625444	COC SEQUENCE NUMBER (Circle) COC: 1 (2) 3 4 5 6 7	Other comments:	
SAMPLER: Kate Woods SAMPLER MOBILE:	OF: 1 (2) 3 4 5 6 7		
COC Emailed to ALS? (YES / (NO) EDD FORMAT (or default):			
Email Reports to (will default to PM if no other addresses are listed): Scadman@environcorp.com			
Email Invoice to (will default to PM if no other addresses are listed): "			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Kwoods	PE		
DATE/TIME: 4/11/13 9:55am ~~10:05am~~	DATE/TIME: 4/11/13 0955	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Soluble Fluoride								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	ELP13lot460SF1	30/10/13	S	unpreserved glass	1	X								
				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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CERTIFICATE OF ANALYSIS

Work Order	: **ES1323625**	Page	: 1 of 5
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 560 NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 04-NOV-2013
Sampler	: KW	Issue Date	: 11-NOV-2013
Site	: ----		
		No. of samples received	: 13
Quote number	: SY/446/12	No. of samples analysed	: 13

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Peter Rennie	Asbestos Identifier	Newcastle - Asbestos

General Comments

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **EA200 Legend**
- **EA200 'Am' Amosite (brown asbestos)**
- **EA200 'Ch' Chrysotile (white asbestos)**
- **EA200 'Cr' Crocidolite (blue asbestos)**
- **EA200 'Trace' - Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres**
- **EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.**
- **EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.**
- **EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	ELP13 LOT 460 ACM1	ELP13 LOT 459 ACM1	ELP13 LOT 461 ACM2	ELP13 LOT 462 ACM2	ELP13 LOT 462 ACM4
			Client sampling date / time	30-OCT-2013 15:00	30-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00
Compound	CAS Number	LOR	Unit	ES1323625-001	ES1323625-002	ES1323625-003	ES1323625-004	ES1323625-005
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Asbestos Type	1332-21-4	0.1	--	**Ch + Am**	**Ch**	**Ch + Cr**	**Ch + Cr**	**Ch + Am**
Sample weight (dry)	----	0.01	g	**65.2**	**62.8**	**34.4**	**26.4**	**36.0**
APPROVED IDENTIFIER:	----	-	--	**P.RENNIE**	**P.RENNIE**	**P.RENNIE**	**P.RENNIE**	**P.RENNIE**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	ELP13 LOT 463 ACM1	ELP13 LOT 458 ACM1	ELP13 LOT 461 SF3	ELP13 LOT 463 SF1	ELP13 LOT 462 SF2
			Client sampling date / time	25-OCT-2013 15:00	30-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00
Compound	CAS Number	LOR	Unit	ES1323625-006	ES1323625-007	ES1323625-008	ES1323625-009	ES1323625-010
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	----	----	4.2	6.2	25.4
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	Yes	----	----	----
Asbestos Type	1332-21-4	0.1	--	Am + Cr	Ch + Am + Cr	----	----	----
Sample weight (dry)	----	0.01	g	1.98	38.4	----	----	----
APPROVED IDENTIFIER:	----	-	--	P.RENNIE	P.RENNIE	----	----	----
EK040: Fluoride								
Fluoride	16984-48-8	1	mg/kg	----	----	6	7	8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	ELP13 LOT 458 SF3	ELP13 LOT 459 SF2	ELP13 LOT 460 SF1	----	----
				Client sampling date / time	30-OCT-2013 15:00	30-OCT-2013 15:00	30-OCT-2013 15:00	----	----
Compound	CAS Number	LOR	Unit		ES1323625-011	ES1323625-012	ES1323625-013	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		**10.7**	**14.4**	**10.3**	----	----
EK040: Fluoride									
Fluoride	16984-48-8	1	mg/kg		**7**	**10**	**1**	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	ELP13 LOT 460 ACM1 - 30-OCT-2013 15:00	Four pieces of bonded asbestos cement sheeting approximately 130 x 50 x 5mm.
EA200: Description	ELP13 LOT 459 ACM1 - 30-OCT-2013 15:00	Three pieces of bonded asbestos cement sheeting approximately 105 x 60 x 5mm.
EA200: Description	ELP13 LOT 461 ACM2 - 25-OCT-2013 15:00	Several pieces of bonded asbestos cement sheeting approximately 45 x 25 x 5mm.
EA200: Description	ELP13 LOT 462 ACM2 - 25-OCT-2013 15:00	Several pieces of bonded asbestos cement sheeting approximately 45 x 35 x 5mm.
EA200: Description	ELP13 LOT 462 ACM4 - 25-OCT-2013 15:00	Several pieces of bonded asbestos cement sheeting approximately 45 x 35 x 7mm.
EA200: Description	ELP13 LOT 463 ACM1 - 25-OCT-2013 15:00	Several pieces of heavily degraded and friable asbestos cement sheeting approximately 10 x 5 x 5mm.
EA200: Description	ELP13 LOT 458 ACM1 - 30-OCT-2013 15:00	Three pieces of bonded asbestos cement sheeting approximately 55 x 45 x 5mm.

QUALITY CONTROL REPORT

Work Order	: **ES1323625**	Page	: 1 of 4
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 560 NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-NOV-2013
Sampler	: KW	Issue Date	: 11-NOV-2013
Order number	: ----		
		No. of samples received	: 13
Quote number	: SY/446/12	No. of samples analysed	: 13

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Peter Rennie	Asbestos Identifier	Newcastle - Asbestos

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.

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (QC Lot: 3147356)									
ES1323625-010	ELP13 LOT 462 SF2	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	25.4	23.8	6.6	0% - 20%
ES1323785-008	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	5.3	6.0	12.3	No Limit
EK040S: Fluoride Soluble (QC Lot: 3144606)									
ES1323625-008	ELP13 LOT 461 SF3	EK040S: Fluoride	16984-48-8	1	mg/kg	6	6	0.0	No Limit
ES1323784-005	Anonymous	EK040S: Fluoride	16984-48-8	1	mg/kg	4	4	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EK040S: Fluoride Soluble (QCLot: 3144606)								
EK040S: Fluoride	16984-48-8	1.0	mg/kg	<1	25.0 mg/kg	116	69	117

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040S: Fluoride Soluble (QCLot: 3144606)							
ES1323625-008	ELP13 LOT 461 SF3	EK040S: Fluoride	16984-48-8	50 mg/kg	108	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK040S: Fluoride Soluble (QCLot: 3144606)										
ES1323625-008	ELP13 LOT 461 SF3	EK040S: Fluoride	16984-48-8	50 mg/kg	108	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1323625**	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 560 NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-NOV-2013
Sampler	: KW	Issue Date	: 11-NOV-2013
Order number	: ----		
		No. of samples received	: 13
Quote number	: SY/446/12	No. of samples analysed	: 13

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Pulp Bag (EA055-103)								
ELP13 LOT 461 SF3, ELP13 LOT 462 SF2	ELP13 LOT 463 SF1,	**25-OCT-2013**	**----**	----	----	**08-NOV-2013**	08-NOV-2013	✓
Soil Glass Jar - Unpreserved (EA055-103)								
ELP13 LOT 458 SF3, ELP13 LOT 460 SF1	ELP13 LOT 459 SF2,	**30-OCT-2013**	**----**	----	----	**08-NOV-2013**	13-NOV-2013	✓
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Snap Lock Bag (EA200)								
ELP13 LOT 461 ACM2, ELP13 LOT 462 ACM4,	ELP13 LOT 462 ACM2, ELP13 LOT 463 ACM1	**25-OCT-2013**	**---**	23-APR-2014	----	**08-NOV-2013**	07-MAY-2014	✓
Snap Lock Bag (EA200)								
ELP13 LOT 460 ACM1, ELP13 LOT 458 ACM1	ELP13 LOT 459 ACM1,	**30-OCT-2013**	**---**	28-APR-2014	----	**08-NOV-2013**	07-MAY-2014	✓
EK040: Fluoride								
Pulp Bag (EK040S)								
ELP13 LOT 461 SF3, ELP13 LOT 462 SF2	ELP13 LOT 463 SF1,	**25-OCT-2013**	**06-NOV-2013**	01-NOV-2013	×	**08-NOV-2013**	04-DEC-2013	✓
Soil Glass Jar - Unpreserved (EK040S)								
ELP13 LOT 458 SF3, ELP13 LOT 460 SF1	ELP13 LOT 459 SF2,	**30-OCT-2013**	**06-NOV-2013**	06-NOV-2013	✓	**08-NOV-2013**	04-DEC-2013	✓

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(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Fluoride - Soluble	EK040S	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Fluoride - Soluble	EK040S	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Fluoride - Soluble	EK040S	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Fluoride - Soluble	EK040S	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples
Fluoride - Soluble	EK040S	SOIL	APHA 21st ed., 4500 F--C Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.

Preparation Methods	Method	Matrix	Method Descriptions
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK040: Fluoride						
Pulp Bag						
ELP13 LOT 461 SF3, ELP13 LOT 463 SF1, ELP13 LOT 462 SF2	06-NOV-2013	01-NOV-2013	**5**	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Updated/Revised C.O.C. 25/03

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
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☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: Environ Australia Pty Ltd
OFFICE: 19B, 50 Glebe Road, The Junction, NSW 2291
PROJECT: Hydro Buffer Zone Investigation — PROJECT NO AS130348
ORDER NUMBER:: AS130348 — PURCHASE ORDER NO.:
PROJECT MANAGER: Steve Cadman — CONTACT PH: 49625444
SAMPLER: Kate Woods/Steve Cadman — SAMPLER MOBILE: 0423583538
COC Emailed to ALS? (YES / NO) Yes — EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed): scadman@environcorp.com
Email Invoice to (will default to PM if no other addresses are listed): scadman@environcorp.com
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☑ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: (1) 2 3 4 5 6 7
OF: 1 2 (3) 4 5 6 7

RELINQUISHED BY: KWoods
DATE/TIME: 21/3/14 5:45pm
RECEIVED BY:
DATE/TIME:
RELINQUISHED BY:
DATE/TIME:
RECEIVED BY:

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

Environmental Division
Sydney
Work Order
ES1406239
Telephone : + 61-2-8784 8555

ALS USE ONLY: LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TPH/BTEX	PAHs	8 metals	asbestos ID	OC/OP Pesticides	asbestos 200N	pH, CEC, TOC	HOLD	
	Parcel 13 Lot 463 TP1 0.2-0.3	20/03/2014	S	glass jars, 1 ziplock	3				x		x			include asbestos ID for ziplock bag
	Parcel 13 Lot 463 TP2 0.2-0.3	20/03/2014	S	glass jars	2								x	
	Parcel 13 Lot 463 TP2 0.6-0.7	20/03/2014	S	glass jars	2								x	
	Parcel 13 Lot 463 TP3 0.3-0.4	20/03/2014	S	glass jars, ~~[illegible]~~	2~~4~~				x		x	x		~~include asbestos ID for ziplock bag~~
	Parcel 13 Lot 463 TP3 0.8-0.9	20/03/2014	S	glass jars	2				x					
	Parcel 13 Lot 463 TP4 0.6-0.7	20/03/2014	S	glass jars, ~~[illegible]~~	2~~4~~	x	x	x	x		x			
	Parcel 13, Lot 463 TP4 0-0.2		S	glass jars	2								X	
	TP4 2.2		S	glass jars	2								X	
	TP5 1.1-1.3		S	glass jars, 1 ziplock	3				X		X			include asbestos ID for ziplock bag
	TP5 2.1-2.2		S	glass jars	2								X	
	TP6 0.3-0.5		S	glass jars, 1 ziplock	3								X	
	TP6 0.7-0.8		S	glass jars	2								X	
	TP7 0-0.3		S	glass jars	2	X	X	X	X		X →		→	If asbestos is ID'd please do 200N analysis but if not ID'd please do not.
				TOTAL	~~13~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~		

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: Environ Australia Pty Ltd
OFFICE: 19B, 50 Glebe Road, The Junction, NSW 2291
PROJECT: Hydro Buffer Zone Investigation — **PROJECT NO** AS130348
ORDER NUMBER:: AS130348 — **PURCHASE ORDER NO.:**
PROJECT MANAGER: Steve Cadman — **CONTACT PH:** 49625444
SAMPLER: Kate Woods/Steve Cadman — **SAMPLER MOBILE:** 0423583538
COC Emailed to ALS? (YES / NO) Yes — **EDD FORMAT (or default):**
Email Reports to (will default to PM if no other addresses are listed): scadman@environcorp.com
Email Invoice to (will default to PM if no other addresses are listed): scadman@environcorp.com
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)
☑ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 (2) 3 4 5 6 7
OF: 1 2 (3) 4 5 6 7

RELINQUISHED BY: KWoods
DATE/TIME: 21/3/14 5:45pm

RECEIVED BY:
DATE/TIME:

RELINQUISHED BY:
DATE/TIME:

RECEIVED BY:
DATE/TIME:

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

ALS USE ONLY: LAB ID	SAMPLE DETAILS MATRIX: Solid(S) Water(W): SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION: TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TPH/BTEX	PAHs	8 metals	asbestos ID	OC/OP Pesticides	asbestos 200N	pH, CEC, TOC	HOLD	Additional Information: Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	Parcel 13, (Lot 463)													
	TP71-1.1	20/3/14	S	glass jars	2	X	X	X	X					
	QA1	↓	S	glass jars		X	X	X	X					
	SP1	↓	S	1 ziplock & 1 glass jar	2								X	
	SP2	21/3/14	S	glass jars	2				X					
	TP9 Gully 0.5-0.6	21/3/14	S	glass jars, ~~ziplock~~	~~3~~ 2	X	X	X	X		X			
	TP9 Gully 0-0.3	"	S	glass jars, ~~ziplock~~	~~3~~ 2				~~ziplock~~				X	~~analysis for ziplock bag only~~
	TP8 0-0.2		S	glass jars	2								X	
	TP8 0.5-0.6		S	glass jars	2								X	
	TP8 1-1.2	↓	S	glass jars	2								X	
	Parcel 13, (Lot 462)		S											
	TPA 0.3-0.5	21/3/14	S	glass jars	2				X		X			→ If asbestos is ID'd, please do 200N analysis
	TPB 0.3-0.5		S	glass jars, 1 ziplock	3				X		X			→ include asbestos ID for ziplock bag!
	TPB 0.8-1.0	↓	S	glass jars	2								X	
				TOTAL	0	0	0	0	0	0	0	0		

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

(ALS)

ALS Laboratory: please tick →

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CLIENT: Environ Australia Pty Ltd

OFFICE: 19B, 50 Glebe Road, The Junction, NSW 2291

PROJECT: Hydro Buffer Zone Investigation — PROJECT NO AS130348

ORDER NUMBER:: AS130348 — PURCHASE ORDER NO.:

PROJECT MANAGER: Steve Cadman — CONTACT PH: 49625444

SAMPLER: Kate Woods/Steve Cadman — SAMPLER MOBILE: 0423583538

COC Emailed to ALS? (YES / NO) Yes — EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed): scadman@environcorp.com

Email Invoice to (will default to PM if no other addresses are listed): scadman@environcorp.com

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)
☑ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 (3) 4 5 6 7
OF: 1 2 (3) 4 5 6 7 (8)

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
K Woods			
DATE/TIME: 21/3/14 5:45pm	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TPH/BTEX	PAHs	8 metals	asbestos ID	OC/OP Pesticides	asbestos 200N	pH, CEC, TOC	HOLD	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	Parcel 13, Lot 462													
	TPC 0.3-0.5	21/3/14	S	glass jars, 1 ziplock	3	X	X	X	X		X			include asbestos ID for ziplock bag
	QA 2	↓	S	glass jars	2								X	
	TPC 0.7-0.8	↓	S	glass jars	2								X	
	TP10 0-0.3	↓	S	glass jars & 1 ziplock	3				X		X			include asbestos ID for ziplock bag
	TP10 0.6-0.7	↓	S	glass jars	2								X	
	TPE 0.3-0.5	↓	S	glass jars	2				X		X			if asbestos is ID'd please do 200N analysis
	SP3	↓	S	glass jars & 1 ziplock	3	X	X	X	X		X			include asbestos ID for ziplock bag
	Parcel 13, Lot 463	~~21/3/14~~	S	~~ziplock~~										
	TPGully	21/3/14	S	ziplock	1				X					
	TP4 0.5-0.8	20/3/14	S	ziplock	1				X					
	TP3 0.2-0.4	20/3/14	S	ziplock	1				X					
			S											
			S											
				TOTAL	0	0	0	0	0	0	0	0		

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CERTIFICATE OF ANALYSIS

Work Order	: **ES1406239**	Page	: 1 of 20
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: AS130348		
C-O-C number	: ----	Date Samples Received	: 21-MAR-2014
Sampler	: KW,SC	Issue Date	: 03-APR-2014
Site	: ----		
		No. of samples received	: 38
Quote number	: SY/433/13	No. of samples analysed	: 20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

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

General Comments

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

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

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

Where the LOR of a reported result differs from standard LOR, this may be due to high 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

- **ALS is not NATA accredited for the analysis of Bifenthrin in soils when performed under ALS Method EP068D**
- **EA200 Legend**
- **EA200 'Am' Amosite (brown asbestos)**
- **EA200 'Ch' Chrysotile (white asbestos)**
- **EA200 'Cr' Crocidolite (blue asbestos)**
- **EA200 'Trace' - Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres**
- **EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.**
- **EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.**
- **EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.**
- **EA200Q: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination**
- **EA200Q: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.**
  Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present).
  Percentages for Asbestos content in ACM are based on the 2013 NEPM default values. All numerical results under this method are approximate and should be used as a guide only.
- **EP068: Pozitive results are on samples confirmed by re-extraction and re-analysis.**

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
		Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
Client sampling date / time				20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	7.1	----	11.1	7.1	6.8
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	No	No	Yes	No
Asbestos Type	1332-21-4	-	--	Ch + Cr	-	-	Am + Cr	-
Unknown Mineral Fibre	----	0.1	g/kg	----	----	----	Yes	----
Sample weight (dry)	----	0.01	g	18.8	235	250	10.1	40.0
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	C.OWLER	C.OWLER	G.MORGAN	C.OWLER
EA200Q: Asbestos Quantification (non-NATA)								
Weight Used for % Calculation	----	0.0001	kg	----	----	0.250	----	0.0400
Asbestos Containing Material	1332-21-4	0.1	g	18.8	----	<0.1	10.1	<0.1
Fibrous Asbestos	----	0.002	g	----	----	<0.002	----	<0.002
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%	----	----	<0.01	----	<0.04
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%	----	----	<0.001	----	<0.005
Trace Asbestos Detected	----	5	Fibres	----	----	No	----	No
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	9	----	9	----	12
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	----	<1
Chromium	7440-47-3	2	mg/kg	66	----	16	----	7
Copper	7440-50-8	5	mg/kg	20	----	9	----	52
Lead	7439-92-1	5	mg/kg	36	----	16	----	22
Nickel	7440-02-0	2	mg/kg	3	----	7	----	31
Zinc	7440-66-6	5	mg/kg	52	----	515	----	24
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	----	0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	<0.05	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
Client sampling date / time				20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP068A: Organochlorine Pesticides (OC) - Continued								
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	<0.05	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg	<0.05	----	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg	**0.46**	----	----	<0.05	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	<0.05	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	<0.05	----	----	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg	**0.07**	----	----	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg	**0.6**	----	----	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	<0.2	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	----	<0.05	----
^ **Sum of DDD + DDE + DDT**	----	0.05	mg/kg	**1.13**	----	----	<0.05	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	----	----	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	----	----	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	----	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	----	<0.05	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	----	----	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	----	----	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	----	<0.2	----
Malathion	121-75-5	0.05	mg/kg	<0.05	----	----	<0.05	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	----	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	----	<0.05	----
Parathion	56-38-2	0.2	mg/kg	<0.2	----	----	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	----	----	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	----	----	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
Client sampling date / time				20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP068B: Organophosphorus Pesticides (OP) - Continued								
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	----	----	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	----	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	----	<0.05	----
Ethion	563-12-2	0.05	mg/kg	<0.05	----	----	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	----	----	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	----	----	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
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	**0.7**	----	<0.5	----	**1.7**
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	**1.1**	----	<0.5	----	**1.0**
Pyrene	129-00-0	0.5	mg/kg	**1.1**	----	<0.5	----	**0.8**
Benz(a)anthracene	56-55-3	0.5	mg/kg	**0.7**	----	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	**0.8**	----	<0.5	----	**0.6**
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	**1.2**	----	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	**0.6**	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	**0.9**	----	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	**0.6**	----	<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	**0.8**	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	**8.5**	----	<0.5	----	**4.1**
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	**1.2**	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**1.5**	----	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.7**	----	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg	<50	----	<50	----	**100**
C15 - C28 Fraction	----	100	mg/kg	<100	----	<100	----	**840**
C29 - C36 Fraction	----	100	mg/kg	<100	----	<100	----	**440**
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	<50	----	**1380**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
Client sampling date / time				20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	<10	----	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	----	<10	----	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	----	<50	----	**170**
>C16 - C34 Fraction	----	100	mg/kg	<100	----	<100	----	**1080**
>C34 - C40 Fraction	----	100	mg/kg	<100	----	<100	----	**240**
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	----	<50	----	**1490**
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	----	<50	----	**170**
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	----	<1	----	<1
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**76.1**	----	----	**70.6**	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**78.0**	----	----	**75.7**	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**82.1**	----	**77.8**	----	**81.9**
2-Chlorophenol-D4	93951-73-6	0.1	%	**78.3**	----	**74.0**	----	**79.1**
2.4.6-Tribromophenol	118-79-6	0.1	%	**65.2**	----	**58.8**	----	**67.7**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**84.0**	----	**77.8**	----	**93.7**
Anthracene-d10	1719-06-8	0.1	%	**71.9**	----	**82.5**	----	**73.0**
4-Terphenyl-d14	1718-51-0	0.1	%	**85.9**	----	**77.8**	----	**80.8**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**112**	----	**97.0**	----	**106**
Toluene-D8	2037-26-5	0.1	%	**111**	----	**112**	----	**110**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
			Client sampling date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.1	%	**110**	----	**99.9**	----	**97.3**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
Client sampling date / time				20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	16.7	16.5	----	12.3	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
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	58.2	50.2	268	71.6	309
APPROVED IDENTIFIER:	----	-	--	C.OWLER	C.OWLER	C.OWLER	C.OWLER	C.OWLER
EA200Q: Asbestos Quantification (non-NATA)								
Weight Used for % Calculation	----	0.0001	kg	----	----	----	0.0716	0.309
Asbestos Containing Material	1332-21-4	0.1	g	----	----	----	<0.1	<0.1
Fibrous Asbestos	----	0.002	g	----	----	----	<0.002	<0.002
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%	----	----	----	<0.02	<0.01
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%	----	----	----	<0.003	<0.001
Trace Asbestos Detected	----	5	Fibres	----	----	----	No	No
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	15	13	----	10	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	<1	----
Chromium	7440-47-3	2	mg/kg	32	32	----	17	----
Copper	7440-50-8	5	mg/kg	<5	<5	----	<5	----
Lead	7439-92-1	5	mg/kg	11	11	----	11	----
Nickel	7440-02-0	2	mg/kg	<2	<2	----	3	----
Zinc	7440-66-6	5	mg/kg	6	6	----	30	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg	----	----	----	<0.05	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
			Client sampling date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP068A: Organochlorine Pesticides (OC) - Continued								
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	<0.05	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg	----	----	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	<0.05	----
Endrin	72-20-8	0.05	mg/kg	----	----	----	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	<0.05	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	----	----	----	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	<0.2	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg	----	----	----	<0.05	----
^ **Sum of DDD + DDE + DDT**	----	0.05	mg/kg	----	----	----	<0.05	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	<0.05	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	<0.2	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	<0.05	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	<0.05	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
Client sampling date / time				20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP068B: Organophosphorus Pesticides (OP) - Continued								
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	<0.05	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
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)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	----	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	----	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	**110**	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	**110**	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
Client sampling date / time				20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 - Continued								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	<10	----
>C10 - C16 Fraction	>C10_C16	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	----	**100**	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	<50	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	<1	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	----	**78.0**	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	----	----	----	**92.0**	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**87.0**	**86.0**	----	**94.7**	----
2-Chlorophenol-D4	93951-73-6	0.1	%	**82.4**	**78.9**	----	**84.7**	----
2.4.6-Tribromophenol	118-79-6	0.1	%	**64.8**	**63.9**	----	**72.4**	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**95.2**	**101**	----	**101**	----
Anthracene-d10	1719-06-8	0.1	%	**92.2**	**98.7**	----	**99.6**	----
4-Terphenyl-d14	1718-51-0	0.1	%	**87.0**	**93.9**	----	**96.6**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**103**	**107**	----	**108**	----
Toluene-D8	2037-26-5	0.1	%	**103**	**107**	----	**105**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
			Client sampling date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.1	%	**102**	**102**	----	**101**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
Client sampling date / time				21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	----	5.9	----	----	10.2
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	Yes
Asbestos Type	1332-21-4	-	--	-	-	-	-	Ch
Sample weight (dry)	----	0.01	g	9.60	52.4	296	350	33.9
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	C.OWLER	C.OWLER	C.OWLER	G.MORGAN
EA200Q: Asbestos Quantification (non-NATA)								
Weight Used for % Calculation	----	0.0001	kg	----	0.0524	0.296	0.350	----
Asbestos Containing Material	1332-21-4	0.1	g	<0.1	<0.1	<0.1	<0.1	33.9
Fibrous Asbestos	----	0.002	g	----	<0.002	<0.002	<0.002	----
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%	----	<0.03	<0.01	<0.01	----
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%	----	<0.004	<0.001	<0.001	----
Trace Asbestos Detected	----	5	Fibres	----	No	No	No	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	9	----	----	10
Cadmium	7440-43-9	1	mg/kg	----	<1	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	9	----	----	15
Copper	7440-50-8	5	mg/kg	----	15	----	----	24
Lead	7439-92-1	5	mg/kg	----	38	----	----	57
Nickel	7440-02-0	2	mg/kg	----	5	----	----	4
Zinc	7440-66-6	5	mg/kg	----	122	----	----	445
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	----	----	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	----	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	----	<0.05
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	----	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	----	<0.05
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	----	<0.05
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	----	<0.05
Aldrin	309-00-2	0.05	mg/kg	----	----	----	----	<0.05

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
Client sampling date / time				21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EP068A: Organochlorine Pesticides (OC) - Continued								
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	----	<0.05
^ **Total Chlordane (sum)**	----	0.05	mg/kg	----	----	----	----	**0.12**
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	----	**0.12**
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	----	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	----	<0.05
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	----	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	----	**0.31**
Endrin	72-20-8	0.05	mg/kg	----	----	----	----	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	<0.05
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	----	----	----	----	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	**0.14**
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	<0.2
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	<0.05
^ **Sum of DDD + DDE + DDT**	----	0.05	mg/kg	----	----	----	----	**0.45**
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	<0.2
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	<0.05
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	<0.2
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	<0.05
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	<0.05
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	<0.05

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
Client sampling date / time				21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EP068B: Organophosphorus Pesticides (OP) - Continued								
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	<0.05
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	----	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	----	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	----	----	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	----	<0.5	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	----	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	----	----	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg	----	<0.5	----	----	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg	----	<0.5	----	----	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg	----	**0.6**	----	----	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg	----	**1.2**	----	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	----	----	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	----	----	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	----	----	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	----	----	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg	----	<50	----	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
Client sampling date / time				21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
				ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 - Continued								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	----	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	----	----	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg	----	<50	----	----	<50
>C16 - C34 Fraction	----	100	mg/kg	----	<100	----	----	<100
>C34 - C40 Fraction	----	100	mg/kg	----	<100	----	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	----	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	----	----	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	----	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	----	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	----	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	----	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	----	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	----	----	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	<0.5	----	----	<0.5
Naphthalene	91-20-3	1	mg/kg	----	<1	----	----	<1
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	----	----	**74.3**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	----	----	----	----	**121**
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	----	**88.0**	----	----	**79.3**
2-Chlorophenol-D4	93951-73-6	0.1	%	----	**80.3**	----	----	**75.6**
2.4.6-Tribromophenol	118-79-6	0.1	%	----	**63.8**	----	----	**62.4**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	**100**	----	----	**94.4**
Anthracene-d10	1719-06-8	0.1	%	----	**95.0**	----	----	**91.3**
4-Terphenyl-d14	1718-51-0	0.1	%	----	**93.5**	----	----	**93.9**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	**118**	----	----	**110**
Toluene-D8	2037-26-5	0.1	%	----	**112**	----	----	**112**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
			Client sampling date / time	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.1	%	----	**104**	----	----	**105**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL13 LOT462 TP GULLY Client sampling date / time: 21-MAR-2014 15:00 ES1406239-018	Client sample ID: PARCEL13 LOT462 TP4 0.5-0.8 Client sampling date / time: 20-MAR-2014 15:00 ES1406239-019	Client sample ID: PARCEL13 LOT462 TP3 0.2-0.4 Client sampling date / time: 20-MAR-2014 15:00 ES1406239-020	Client sample ID: PARCEL13 LOT463 TP2 0.6-0.7 Client sampling date / time: 20-MAR-2014 15:00 ES1406239-022	Client sample ID: PARCEL 13 LOT 463 TP3 0.3-0.4 Client sampling date / time: 21-MAR-2014 15:00 ES1406239-038
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	**4.0**
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	**Yes**	**Yes**	**No**	**No**
Asbestos Type	1332-21-4	-	--	**Ch + Am + Cr**	**Ch + Am + Cr**	**Am + Cr**	**-**	**-**
Unknown Mineral Fibre	----	0.1	g/kg	----	----	**Yes**	----	----
Sample weight (dry)	----	0.01	g	**34.4**	**46.6**	**48.4**	**73.2**	**305**
APPROVED IDENTIFIER:	----	-	--	**G.MORGAN**	**G.MORGAN**	**G.MORGAN**	**C.OWLER**	**C.OWLER**
EA200Q: Asbestos Quantification (non-NATA)								
Weight Used for % Calculation	----	0.0001	kg	----	----	----	**0.0732**	**0.305**
Asbestos Containing Material	1332-21-4	0.1	g	----	----	----	<0.1	<0.1
Fibrous Asbestos	----	0.002	g	----	----	----	<0.002	<0.002
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%	----	----	----	<0.02	<0.01
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%	----	----	----	<0.003	<0.001
Trace Asbestos Detected	----	5	Fibres	----	----	----	**No**	**No**
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	**2.0**
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	**0.2**
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	**0.2**
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	<0.1
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	**2.4**
EP004: Organic Matter								
Organic Matter	----	0.5	%	----	----	----	----	**4.7**
Total Organic Carbon	----	0.5	%	----	----	----	----	**2.7**

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	PARCEL13 LOT463 TP1 0.2-0.3 - 20-MAR-2014 15:00	One piece of heavily degraded and friable asbestos cement sheeting approximately 80 x 50 x 4mm
EA200: Description	PARCEL13 LOT463 TP3 0.8-0.9 - 20-MAR-2014 15:00	Pale brown clay soil with some small red rocks plus a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP4 0.6-0.7 - 20-MAR-2014 15:00	Mid brown soil with some quartz and charcoal grains plus a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP5 1.1-1.3 - 21-MAR-2014 15:00	One piece of heavily degraded and friable asbestos cement sheeting approximately 60 x 45 x 4mm
EA200: Description	PARCEL13 LOT463 TP7 0-0.3 - 21-MAR-2014 15:00	Dark grey soil with some slag grains plus a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP7 1-1.1 - 20-MAR-2014 15:00	Mid orange clay soil with a trace of vegetation
EA200: Description	PARCEL13 LOT463 QA1 - 20-MAR-2014 15:00	Mid orange clay soil with a trace of vegetation
EA200: Description	PARCEL13 LOT463 SP2 - 21-MAR-2014 15:00	Mid brown clay soil with some small red rocks plus some quartz grains and a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP9 0.5-0.6 GU - 21-MAR-2014 15:00	Mid orange-brown clay soil with some red rocks plus a trace of vegetation
EA200: Description	PARCEL13 LOT462 TPA 0.3-0.5 - 21-MAR-2014 15:00	Mid grey-brown sandy soil with a trace of vegetation
EA200: Description	PARCEL13 LOT462 TPB 0.3-0.5 - 21-MAR-2014 15:00	Two pieces of cement sheeting approximately 40 x 20 x 5mm
EA200: Description	PARCEL13 LOT462 TPC 0.3-0.5 - 21-MAR-2014 15:00	Mid brown sandy soil with some shell debris plus a trace of vegetation
EA200: Description	PARCEL13 LOT462 TP10 0-0.3 - 21-MAR-2014 15:00	Mid grey-brown sandy soil with some grey and red rocks plus some quartz grains and a trace of vegetation
EA200: Description	PARCEL13 LOT462 TPE 0.3-0.5 - 21-MAR-2014 15:00	Mid grey-brown sandy soil with some grey and red rocks plus some quartz grains and a trace of vegetation
EA200: Description	PARCEL13 LOT462 SP3 - 21-MAR-2014 15:00	Two pieces of bonded asbestos cement sheeting approximately 55 x 40 x 5mm
EA200: Description	PARCEL13 LOT462 TP GULLY - 21-MAR-2014 15:00	Four pieces of bonded asbestos cement sheeting approximately 55 x 45 x 4mm
EA200: Description	PARCEL13 LOT462 TP4 0.5-0.8 - 20-MAR-2014 15:00	One piece of bonded asbestos cement sheeting approximately 70 x 65 x 5mm
EA200: Description	PARCEL13 LOT462 TP3 0.2-0.4 - 20-MAR-2014 15:00	Three pieces of heavily degraded and friable asbestos cement sheeting approximately 55 x 40 x 5mm
EA200: Description	PARCEL13 LOT463 TP2 0.6-0.7 - 20-MAR-2014 15:00	Pale yellow-orange clay soil with a trace of vegetation
EA200: Description	PARCEL 13 LOT 463 TP3 0.3-0.4 - 21-MAR-2014 15:00	Mid brown clay soil with some quartz grains plus a trace of vegetation

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
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	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

QUALITY CONTROL REPORT

Work Order	: **ES1406239**	Page	: 1 of 13
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 21-MAR-2014
Sampler	: KW,SC	Issue Date	: 03-APR-2014
Order number	: AS130348		
		No. of samples received	: 38
Quote number	: SY/433/13	No. of samples analysed	: 20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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

General Comments

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

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

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

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

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

Signatories

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

Signatories	Position	Accreditation Category
		Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 3365943)									
ES1406229-021	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.2	6.2	0.0	0% - 20%
ES1406306-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	5.1	5.1	0.0	0% - 20%
EA055: Moisture Content (QC Lot: 3363968)									
ES1406063-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	33.7	33.8	0.0	0% - 20%
ES1406239-005	PARCEL13 LOT463 TP5 1.1-1.3	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	7.1	7.8	8.8	No Limit
ED007: Exchangeable Cations (QC Lot: 3363169)									
ES1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	ED007: Exchangeable Calcium	----	0.1	meq/100g	2.0	1.7	12.5	0% - 20%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.2	0.1	0.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.0	0% - 20%
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.0	0% - 20%
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	2.4	2.1	12.3	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 3365885)									
ES1406140-008	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	5	5	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.0	No Limit
ES1406239-008	PARCEL13 LOT463 QA1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	32	31	0.0	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	13	12	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	11	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	6	5	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3365886)									
ES1406140-008	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1406239-008	PARCEL13 LOT463 QA1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP004: Organic Matter (QC Lot: 3368119)									
ES1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	EP004: Organic Matter	----	0.5	%	4.7	4.7	0.0	No Limit
		EP004: Total Organic Carbon	----	0.5	%	2.7	2.7	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3361560)									
ES1406393-001	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1406394-008	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3361560) - continued									
ES1406394-008	Anonymous	EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3361560)									
ES1406393-001	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1406394-008	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3361560) - continued									
ES1406394-008	Anonymous	EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3361413)									
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.7	0.7	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.1	1.2	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.1	1.2	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.7	0.7	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	0.8	0.9	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	1.2	1.2	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	0.6	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.9	0.6	28.5	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	0.6	0.5	18.1	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.8	0.6	20.9	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	8.5	7.6	11.2	0% - 50%
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	1.2	0.8	35.6	No Limit
ES1406497-006	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.6	0.6	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.4	1.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.4	1.4	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.5	0.6	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	0.7	0.8	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.9	1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.6	0.7	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	6.1	7.6	21.9	0% - 50%
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	1.0	1.2	15.8	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3361276)									
EB1406826-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1406494-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3361412)									
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1406497-006	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3361276)									
EB1406826-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES1406494-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3361412)									
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
ES1406497-006	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3361276)									
EB1406826-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1406494-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED007: Exchangeable Cations (QCLot: 3363169)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 3365885)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	124	92	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	87	121
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	95.8	80	136
EG005T: Copper	7440-50-8	5	mg/kg	<5	32.0 mg/kg	104	93	127
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	100	86	124
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.0 mg/kg	106	93	131
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	105	81	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3365886)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	97.6	70	105
EP004: Organic Matter (QCLot: 3368119)								
EP004: Organic Matter	----	0.5	%	<0.5	4.58 %	97.8	85	105
EP004: Total Organic Carbon	----	0.5	%	<0.5	2.66 %	97.7	84	106
EP068A: Organochlorine Pesticides (OC) (QCLot: 3361560)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	71	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.7	66	122
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	102	69	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	71	115
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	65	113
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.6	68	116
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	102	68	118
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	94.5	68	116
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	92.2	68	120
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	96.3	69	119
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.5	67	121
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	90.9	66	118
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.8	69	117
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.9	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.8	76	120

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 3361560) - continued								
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.3	76	120
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	111	57.3	115
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	102	60	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	96.7	67	127
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	110	65	123
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	97.5	65	129
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3361560)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	76.3	56	126
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.7	64	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	81.0	54	122
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	101	64	124
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	79.0	73	117
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	105	55	119
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	103	69	123
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	102	70	120
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.1	71	115
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	96.6	68	114
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	87.5	68	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	69	115
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.7	70	118
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.8	68	116
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	92.2	64	120
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	93.9	68	116
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	96.6	70	118
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	95.4	67	123
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	94.0	42	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3361413)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	81.4	80	124
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	86.6	77	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	88.0	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	94.6	77	123
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	96.0	79	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	101	79	123
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	93.1	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	97.3	79	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	89.3	73	121
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	92.6	81	123
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	81.7	70	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	101	77	123

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3361413) - continued								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	119	76	122
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	106	71	113
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	109	71.7	113
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	103	72.4	114
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3361276)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	101	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3361412)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	92.4	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	97.2	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	103	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3361276)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	99.4	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3361412)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	96.6	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	97.7	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	111	63	131
EP080: BTEXN (QCLot: 3361276)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	107	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	106	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	100	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	99.0	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	100	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	89.6	62	138

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 3365885)							
ES1406140-008	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	118	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	103	70	130
		EG005T: Copper	7440-50-8	125 mg/kg	106	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 3365885) - continued							
ES1406140-008	Anonymous	EG005T: Lead	7439-92-1	125 mg/kg	103	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	98.5	70	130
		EG005T: Zinc	7440-66-6	125 mg/kg	102	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3365886)							
ES1406140-008	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	92.7	70	130
EP004: Organic Matter (QCLot: 3368119)							
ES1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	EP004: Organic Matter	----	1.77 %	102	----	----
		EP004: Total Organic Carbon	----	1.03 %	101	----	----
EP068A: Organochlorine Pesticides (OC) (QCLot: 3361560)							
ES1406393-001	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	95.8	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	100	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	96.9	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	104	70	130
		EP068: Endrin	72-20-8	2 mg/kg	102	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	100	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3361560)							
ES1406393-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	106	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	77.5	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	99.9	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	104	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	83.1	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3361413)							
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	73.5	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	# 66.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3361276)							
EB1406826-002	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	99.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3361412)							
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: C10 - C14 Fraction	----	640 mg/kg	80.2	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	90.1	53	131
		EP071: C29 - C36 Fraction	----	2860 mg/kg	78.4	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3361276)							
EB1406826-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.0	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3361412)							
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	109	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	81.1	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	66.2	52	132

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 3361276)							
EB1406826-002	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	95.5	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	93.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.6	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	91.9	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.5	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.1	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPDs (%): Value	RPDs (%): Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3361276)										
EB1406826-002	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	99.7	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3361276)										
EB1406826-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.0	----	70	130	----	----
EP080: BTEXN (QCLot: 3361276)										
EB1406826-002	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	95.5	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	93.6	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.6	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	91.9	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.5	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.1	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3361412)										
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: C10 - C14 Fraction	----	640 mg/kg	80.2	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	3140 mg/kg	90.1	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	2860 mg/kg	78.4	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3361412)										
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	109	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	81.1	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	66.2	----	52	132	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3361413)										
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	73.5	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	# 66.8	----	70	130	----	----

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP068A: Organochlorine Pesticides (OC) (QCLot: 3361560)										
ES1406393-001	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	95.8	----	70	130	----	----
		EP068: Heptachlor	76-44-8	0.5 mg/kg	100	----	70	130	----	----
		EP068: Aldrin	309-00-2	0.5 mg/kg	96.9	----	70	130	----	----
		EP068: Dieldrin	60-57-1	0.5 mg/kg	104	----	70	130	----	----
		EP068: Endrin	72-20-8	2 mg/kg	102	----	70	130	----	----
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	100	----	70	130	----	----
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3361560)										
ES1406393-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	106	----	70	130	----	----
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	77.5	----	70	130	----	----
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	99.9	----	70	130	----	----
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	104	----	70	130	----	----
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	83.1	----	70	130	----	----
EG005T: Total Metals by ICP-AES (QCLot: 3365885)										
ES1406140-008	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	118	----	70	130	----	----
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	----	70	130	----	----
		EG005T: Chromium	7440-47-3	50 mg/kg	103	----	70	130	----	----
		EG005T: Copper	7440-50-8	125 mg/kg	106	----	70	130	----	----
		EG005T: Lead	7439-92-1	125 mg/kg	103	----	70	130	----	----
		EG005T: Nickel	7440-02-0	50 mg/kg	98.5	----	70	130	----	----
		EG005T: Zinc	7440-66-6	125 mg/kg	102	----	70	130	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3365886)										
ES1406140-008	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	92.7	----	70	130	----	----
EP004: Organic Matter (QCLot: 3368119)										
ES1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	EP004: Organic Matter	----	1.77 %	102	----	----	----	----	----
		EP004: Total Organic Carbon	----	1.03 %	101	----	----	----	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1406239**	Page	: 1 of 8
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 21-MAR-2014
Sampler	: KW,SC	Issue Date	: 03-APR-2014
Order number	: AS130348		
		No. of samples received	: 38
Quote number	: SY/433/13	No. of samples analysed	: 20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
PARCEL 13 LOT 463 TP3 0.3-0.4	**21-MAR-2014**	**31-MAR-2014**	28-MAR-2014	×	**28-MAR-2014**	31-MAR-2014	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
PARCEL13 LOT463 TP1 0.2-0.3, PARCEL13 LOT463 TP4 0.6-0.7, PARCEL13 LOT463 TP7 1-1.1, PARCEL13 LOT463 QA1	**20-MAR-2014**	**----**	----	----	**28-MAR-2014**	03-APR-2014	✓
Soil Glass Jar - Unpreserved (EA055-103)							
PARCEL13 LOT463 TP5 1.1-1.3, PARCEL13 LOT463 TP7 0-0.3, PARCEL13 LOT463 TP9 0.5-0.6 GU, PARCEL13 LOT462 TPC 0.3-0.5, PARCEL13 LOT462 SP3	**21-MAR-2014**	**----**	----	----	**28-MAR-2014**	04-APR-2014	✓
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples							
Snap Lock Bag (EA200)							
PARCEL13 LOT463 TP1 0.2-0.3, PARCEL13 LOT462 TP4 0.5-0.8, PARCEL13 LOT462 TP3 0.2-0.4	**20-MAR-2014**	**---**	16-SEP-2014	----	**03-APR-2014**	30-SEP-2014	✓
Snap Lock Bag (EA200)							
PARCEL13 LOT462 TPB 0.3-0.5, PARCEL13 LOT462 TPC 0.3-0.5, PARCEL13 LOT462 TP10 0-0.3, PARCEL13 LOT462 SP3, PARCEL13 LOT462 TP GULLY	**21-MAR-2014**	**---**	17-SEP-2014	----	**03-APR-2014**	30-SEP-2014	✓
Soil Glass Jar - Unpreserved (EA200)							
PARCEL13 LOT463 TP3 0.8-0.9, PARCEL13 LOT463 TP4 0.6-0.7, PARCEL13 LOT463 TP7 1-1.1, PARCEL13 LOT463 QA1, PARCEL13 LOT463 TP2 0.6-0.7	**20-MAR-2014**	**---**	16-SEP-2014	----	**03-APR-2014**	30-SEP-2014	✓
Soil Glass Jar - Unpreserved (EA200)							
PARCEL13 LOT463 TP5 1.1-1.3, PARCEL13 LOT463 TP7 0-0.3, PARCEL13 LOT463 SP2, PARCEL13 LOT463 TP9 0.5-0.6 GU, PARCEL13 LOT462 TPA 0.3-0.5, PARCEL13 LOT462 TPE 0.3-0.5, PARCEL 13 LOT 463 TP3 0.3-0.4	**21-MAR-2014**	**---**	17-SEP-2014	----	**03-APR-2014**	30-SEP-2014	✓
ED007: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED007)							
PARCEL 13 LOT 463 TP3 0.3-0.4	**21-MAR-2014**	**31-MAR-2014**	18-APR-2014	✓	**31-MAR-2014**	18-APR-2014	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	**20-MAR-2014**	**31-MAR-2014**	16-SEP-2014	✓	**01-APR-2014**	16-SEP-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EG005T)								
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**31-MAR-2014**	17-SEP-2014	✓	**01-APR-2014**	17-SEP-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	**20-MAR-2014**	**31-MAR-2014**	17-APR-2014	✓	**01-APR-2014**	17-APR-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EG035T)								
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**31-MAR-2014**	18-APR-2014	✓	**01-APR-2014**	18-APR-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							
EP004: Organic Matter								
Soil Glass Jar - Unpreserved (EP004)								
PARCEL 13 LOT 463 TP3 0.3-0.4		**21-MAR-2014**	**01-APR-2014**	18-APR-2014	✓	**01-APR-2014**	18-APR-2014	✓
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068)								
PARCEL13 LOT463 TP1 0.2-0.3		**20-MAR-2014**	**28-MAR-2014**	03-APR-2014	✓	**29-MAR-2014**	07-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP068)								
PARCEL13 LOT463 TP5 1.1-1.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**28-MAR-2014**	04-APR-2014	✓	**29-MAR-2014**	07-MAY-2014	✓
PARCEL13 LOT462 SP3								
EP068B: Organophosphorus Pesticides (OP)								
Soil Glass Jar - Unpreserved (EP068)								
PARCEL13 LOT463 TP1 0.2-0.3		**20-MAR-2014**	**28-MAR-2014**	03-APR-2014	✓	**29-MAR-2014**	07-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP068)								
PARCEL13 LOT463 TP5 1.1-1.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**28-MAR-2014**	04-APR-2014	✓	**29-MAR-2014**	07-MAY-2014	✓
PARCEL13 LOT462 SP3								
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP071)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	**20-MAR-2014**	**27-MAR-2014**	03-APR-2014	✓	**29-MAR-2014**	06-MAY-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EP071)								
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**27-MAR-2014**	04-APR-2014	✓	**29-MAR-2014**	06-MAY-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM))								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	**20-MAR-2014**	**27-MAR-2014**	03-APR-2014	✓	**29-MAR-2014**	06-MAY-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EP075(SIM))								
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**27-MAR-2014**	04-APR-2014	✓	**29-MAR-2014**	06-MAY-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	**20-MAR-2014**	**28-MAR-2014**	03-APR-2014	✓	**29-MAR-2014**	03-APR-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EP080)								
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**28-MAR-2014**	04-APR-2014	✓	**29-MAR-2014**	04-APR-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								
Soil Glass Jar - Unpreserved (EP080)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	**20-MAR-2014**	**28-MAR-2014**	03-APR-2014	✓	**29-MAR-2014**	03-APR-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EP080)								
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	**21-MAR-2014**	**28-MAR-2014**	04-APR-2014	✓	**29-MAR-2014**	04-APR-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							

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(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Exchangeable Cations	ED007	1	5	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organic Matter	EP004	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Exchangeable Cations	ED007	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organic Matter	EP004	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Exchangeable Cations	ED007	1	5	**20.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organic Matter	EP004	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organic Matter	EP004	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples
Asbestos - Quantitative Analysis	* EA200Q	SOIL	Asbestos Materials Content with Confirmation of Identification by AS 4964 - 2004 Asbestos
Exchangeable Cations	ED007	SOIL	Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) 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	AS 3550, APHA 21st ed., 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)
Organic Matter	EP004	SOIL	AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Preparation Methods	Method	Matrix	Method Descriptions
Organic Matter	EP004-PR	SOIL	AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1406239-001	PARCEL13 LOT463 TP1 0.2-0	**Pyrene**	129-00-0	66.8 %	70-130%	**Recovery less than lower data quality objective**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)						
Soil Glass Jar - Unpreserved						
PARCEL 13 LOT 463 TP3 0.3-0.4	31-MAR-2014	28-MAR-2014	**3**	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: Environ Australia Pty Ltd
OFFICE: 19B, 50 Glebe Road, The Junction, NSW 2291
PROJECT: Hydro Buffer Zone Investigation — **PROJECT NO** AS130348
ORDER NUMBER:: AS130348 — **PURCHASE ORDER NO.:**
PROJECT MANAGER: Steve Cadman — **CONTACT PH:** 49625444
SAMPLER: Kate Woods/Steve Cadman — **SAMPLER MOBILE:** 0423583538
COC Emailed to ALS? (YES / NO) Yes — **EDD FORMAT (or default):**
Email Reports to (will default to PM if no other addresses are listed): ~~scadman@environcorp.com~~ kwoods@environcorp.com
Email Invoice to (will default to PM if no other addresses are listed): scadman@environcorp.com
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☑ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: (1) 2 3 4 5 6 7
OF: 1 2 3 (4) 5 6 7

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
KWoods	Ke	Ce	RAL
DATE/TIME: 3/4/14 14:10	DATE/TIME: 3.4.14 1410	DATE/TIME: 3.4.14 1700	DATE/TIME: 3/4/14 1900

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

Subcon / Forward Lab / Split WO
Lab / Analysis: Newcastle / Asbestos (14),(31)
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

SAMPLE INFORMATION — MATRIX: Solid(S) Water(W)

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) — Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

ALS USE ONLY LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TPH/BTEX	PAHs	8 metals	asbestos ID	OC/OP Pesticides	asbestos 200N	pH, CEC, TOC	HOLD	Additional Information (Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis)
1	Parcel 13 Lot 460 [illegible] TP1	31/3/14	S	glass jars	2				X		X			
2	TP2	↓	S	↓	2				X		X			
3	TP3		S		2				X		X			Jar kept [illegible]
4	TP4	0	S		2	X	X	X	X	X	X			
5	TP8	0	S		2			X	X					
6	Parcel 13 Lot 459 TP11	0	S		2	X	X	X	X	X	X			
7	QA1	0	S		2	X	X	X	X	X	X			
8	TP12	0	S		2	X	X	X	X	X	X			
~~SNR~~ [illegible]	(46) TP15		S		2				X		X			
9	Parcel 13 Lot 458 TP16	0 1/4/14	S	glass jars	2	X	X	X	X	X	X			
10	TP17	0	S	↓	2				X					
11	QA2	0	S		2	X	X	X	X	X	X			
12	TP19	0	S		2			X	X		X			
				TOTAL	0	0	0	0	0	0	0	0		

E-MAILED

Environmental Division
Sydney
Work Order
ES1407306

Telephone : +61-2-8784 8555

Jar kept [illegible]

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: Environ Australia Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☑ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: 19B, 50 Glebe Road, The Junction, NSW 2291		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: Hydro Buffer Zone Investigation — **PROJECT NO** AS130348	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER:: AS130348 — **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN:**	OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Steve Cadman	**CONTACT PH:** 49625444		Other comment:
SAMPLER: Kate Woods/Steve Cadman	**SAMPLER MOBILE:** 0423583538		
COC Emailed to ALS? (YES / NO) Yes	**EDD FORMAT (or default):**		
Email Reports to (will default to PM if no other addresses are listed): ~~scadman@environcorp.com~~ kwoods@environ-corp-com			
Email Invoice to (will default to PM if no other addresses are listed): scadman@environcorp.com			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
K Woods	KE	KE	
DATE/TIME: 3/4/14 14:10	DATE/TIME: 3/4/14 1410	DATE/TIME: 3-4-14 1700	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS Matrix: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TPH/BTEX	PAHs	8 metals	asbestos ID	OC/OP Pesticides	asbestos 200N	pH, CEC, TOC	HOLD	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
SNR	Parcel 13 Lot 458 TP20	1/4/14	S	glass jars	2				X		X			
SNR	TP21		S		2				X		X			
13	TP22		S		2								X	
14	TP23		S		2	X	X	X	X	X	X			Only if pre-selected
15	Parcel 13 Lot 459 TP27		S		2				X		X			
16	TP28		S		2				X		X			
17	TP29		S		2				X		X			
18	TP30		S		2				X		X			
19	TP31		S		2				X		X			
20	TP32		S		2				X		X			
21	TP33 ~~TP34~~		S		2				X		X			
22	TP34	2/4/14	S		2				X		X			
23	TP35		S		2				X		X			
				TOTAL	0	0	0	0	0	0	0	0		

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; U = Ultra-pure Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: Environ Australia Pty Ltd

OFFICE: 19B, 50 Glebe Road, The Junction, NSW 2291

PROJECT: Hydro Buffer Zone Investigation — PROJECT NO AS130348

ORDER NUMBER:: AS130348 — PURCHASE ORDER NO.:

PROJECT MANAGER: Steve Cadman — CONTACT PH: 49625444

SAMPLER: Kate Woods/Steve Cadman — SAMPLER MOBILE: 0423583538

COC Emailed to ALS? (YES / NO) Yes — EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed): ~~scadman@environcorp.com~~ kwoods@environcorp.com

Email Invoice to (will default to PM if no other addresses are listed): scadman@environcorp.com

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)

☑ Standard TAT (List due date):

☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 3/4/14 14:10	DATE/TIME: 3/4/14 1400	DATE/TIME: 3.4.14 1700	DATE/TIME:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TPH/BTEX	PAHs	8 metals	asbestos ID	OC/OP Pesticides	asbestos 200N	pH, CEC, TOC	HOLD	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	Parcel 13, Lot 459													
24	TP36	2/4/14	S	glass jars	2				X		X			
25	TP37		S		2				X		X			
26	TP38		S		2				X		X			
27	TP39	0 - 0.5	S		2				X		X			
28	TP41	0	S		2								X	
29	TP42	0	S		2								X	
30	TP44	0	S		2								X	
31	Parcel 12, Lot 11 TP45	0	S		2	X	X		X				X	
32	TP46	0	S		2								X	
33	TP47	0	S		2								X	
34	Parcel 12, Lot 18 TP49	3/4/14	S		2				X				X	
35	TP50	0	S		2	X	X	X	X					
36	QA1	0	S		2	X	X	X	X					
				TOTAL	0	0	0	0	0	0	0	0		

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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CLIENT: Environ Australia Pty Ltd

OFFICE: 19B, 50 Glebe Road, The Junction, NSW 2291

PROJECT: Hydro Buffer Zone Investigation — **PROJECT NO** AS130348

ORDER NUMBER:: AS130348 — **PURCHASE ORDER NO.:**

PROJECT MANAGER: Steve Cadman — **CONTACT PH:** 49625444

SAMPLER: Kate Woods/Steve Cadman — **SAMPLER MOBILE:** 0423583538

COC Emailed to ALS? (YES / NO) Yes — **EDD FORMAT (or default):**

Email Reports to (will default to PM if no other addresses are listed): ~~scadman@environcorp.com~~ kwoods@environcorp.com

Email Invoice to (will default to PM if no other addresses are listed): scadman@environcorp.com

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☑ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 (4) 5 6 7
OF: 1 2 3 (4) 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:	°C		
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
KWoods	ke	ke	
DATE/TIME: 3/4/14 1410	DATE/TIME: 3/4/14 1410	DATE/TIME: 3.4.14 1700	DATE/TIME:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TPH/BTEX	PAHs	8 metals	asbestos ID	OC/OP Pesticides	asbestos 200N	pH, CEC, TOC	HOLD	Additional Information (Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.)
37	Parcel 13 Lot 460 TP1 ACM	31/3/14	S	ziplock	1								X	
38	TP3 ACM	31/3/14	S	ziplock	1								X	
39	Parcel 13 lot 459 TP12 ACM	↓	S	↓	1								X	
40	TP11 ACM	↓	S	↓	1								X	
41	TP27 ACM	1/4/14	S	↓	1								X	All bulk solids kept (?)
42	Parcel 13 lot 458 TP23 ACM		S	↓	1				X					
43	TP19 ACM		S	↓	1				X				~~X~~	
44	TP16 ACM	↓	S	↓	1								X	
			S										X	
	Extra Samples received		S											
45	Parcel 13 lot 458 SP2		S	Jar	1									
46	Parcel 13 lot 459 TP		S	Jar	1									
47	Parcel 13 lot 458 TP18		S	Jar	2									1x Jar kept (?)
48	Parcel 13 lot 459 TP39 0.5-1.0.				TOTAL 0	0	0	0	0	0	0	0		

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CERTIFICATE OF ANALYSIS

Work Order	: **ES1407306**	Page	: 1 of 14
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: AS130348		
C-O-C number	: ----	Date Samples Received	: 03-APR-2014
Sampler	: K.WOODS/S.CADMAN	Issue Date	: 15-APR-2014
Site	: ----		
		No. of samples received	: 48
Quote number	: SY/433/13	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

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

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

- **ALS is not NATA accredited for the analysis of Bifenthrin in soils when performed under ALS Method EP068D**
- **EA200 Legend**
- **EA200 'Am' Amosite (brown asbestos)**
- **EA200 'Ch' Chrysotile (white asbestos)**
- **EA200 'Cr' Crocidolite (blue asbestos)**
- **EA200 'Trace' - Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres**
- **EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.**
- **EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.**
- **EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.**
- **EA200Q: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination**
- **EA200Q: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.**
  Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present).
  Percentages for Asbestos content in ACM are based on the 2013 NEPM default values. All numerical results under this method are approximate and should be used as a guide only.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID	PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
				Client sampling date / time	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
					ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		**18.9**	**13.7**	**19.9**	**21.2**	**25.4**
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		**8**	**14**	**14**	**10**	**18**
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	**1**
Chromium	7440-47-3	2	mg/kg		**27**	**31**	**12**	**11**	**23**
Copper	7440-50-8	5	mg/kg		<5	**8**	**14**	**22**	**22**
Lead	7439-92-1	5	mg/kg		**14**	**16**	**13**	**21**	**56**
Nickel	7440-02-0	2	mg/kg		**4**	**4**	**6**	**7**	**13**
Zinc	7440-66-6	5	mg/kg		**362**	**119**	**283**	**455**	**535**
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
^ **Total Chlordane (sum)**	----	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	<0.2	<0.2	<0.2

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
Client sampling date / time				31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
				ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EP068A: Organochlorine Pesticides (OC) - Continued								
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
^ **Sum of DDD + DDE + DDT**	----	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
Client sampling date / time				31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
				ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
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)fluoranthene	205-99-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg	**0.6**	----	**0.6**	**0.6**	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg	**1.2**	----	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	----	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg	<50	----	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	<10	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	----	<10	<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	----	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	----	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	----	<50	<50	<50
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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
Client sampling date / time				31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
				ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EP080: BTEXN - Continued								
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	----	<1	<1	<1
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**88.5**	----	**82.0**	**84.9**	**72.2**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**88.6**	----	**82.8**	**78.6**	**79.5**
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**121**	----	**110**	**119**	**111**
2-Chlorophenol-D4	93951-73-6	0.1	%	**115**	----	**106**	**115**	**105**
2.4.6-Tribromophenol	118-79-6	0.1	%	**102**	----	**99.3**	**97.8**	**94.0**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**104**	----	**94.6**	**95.1**	**96.1**
Anthracene-d10	1719-06-8	0.1	%	**105**	----	**102**	**104**	**104**
4-Terphenyl-d14	1718-51-0	0.1	%	**120**	----	**116**	**117**	**117**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**111**	----	**85.1**	**89.8**	**85.5**
Toluene-D8	2037-26-5	0.1	%	**123**	----	**85.9**	**88.1**	**83.2**
4-Bromofluorobenzene	460-00-4	0.1	%	**119**	----	**81.4**	**79.7**	**79.6**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
				Client sampling date / time: 01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
				ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	5.5	5.6	8.1	14.7	12.1
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	15	6	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	9	5	10	16	----
Copper	7440-50-8	5	mg/kg	<5	<5	34	16	----
Lead	7439-92-1	5	mg/kg	12	9	17	25	----
Nickel	7440-02-0	2	mg/kg	5	5	6	14	----
Zinc	7440-66-6	5	mg/kg	160	130	362	572	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	----	<0.2	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
			Client sampling date / time	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
				ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EP068A: Organochlorine Pesticides (OC) - Continued								
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
^ **Sum of DDD + DDE + DDT**	----	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	<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	<0.5	<0.5	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
Client sampling date / time				01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
				ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
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)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg	**0.6**	**0.6**	----	**0.6**	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg	**1.2**	**1.2**	----	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg	<50	<50	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	<10	----	<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	<50	----	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	<50	----	<50	<50
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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID: PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
				Client sampling date / time: 01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
				ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EP080: BTEXN - Continued								
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	<0.2	----	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	<1	<1
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**101**	**81.4**	----	**91.8**	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**104**	**80.3**	----	**82.3**	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**116**	**116**	----	**116**	**111**
2-Chlorophenol-D4	93951-73-6	0.1	%	**110**	**108**	----	**111**	**105**
2.4.6-Tribromophenol	118-79-6	0.1	%	**95.3**	**88.7**	----	**94.7**	**97.2**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**94.8**	**93.1**	----	**94.4**	**103**
Anthracene-d10	1719-06-8	0.1	%	**95.6**	**101**	----	**104**	**96.2**
4-Terphenyl-d14	1718-51-0	0.1	%	**115**	**114**	----	**116**	**113**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**100**	**98.7**	----	**96.8**	**96.3**
Toluene-D8	2037-26-5	0.1	%	**97.8**	**94.0**	----	**93.5**	**93.2**
4-Bromofluorobenzene	460-00-4	0.1	%	**94.2**	**89.7**	----	**87.0**	**84.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	PARCEL 12 LOT 10 TP50	PARCEL 12 LOT 10 QA1	----	----	----
			Client sampling date / time	03-APR-2014 15:00	03-APR-2014 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1407306-035	ES1407306-036	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	27.0	18.2	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	5	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	7	13	----	----	----
Copper	7440-50-8	5	mg/kg	16	23	----	----	----
Lead	7439-92-1	5	mg/kg	<5	6	----	----	----
Nickel	7440-02-0	2	mg/kg	4	8	----	----	----
Zinc	7440-66-6	5	mg/kg	31	32	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.2	0.3	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	0.8	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	7.0	0.8	----	----	----
Anthracene	120-12-7	0.5	mg/kg	0.6	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	1.6	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	0.6	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	10.6	0.8	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	----	----	----
EP080/071: Total Petroleum Hydrocarbons								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	PARCEL 12 LOT 10 TP50	PARCEL 12 LOT 10 QA1	----	----	----
				Client sampling date / time	03-APR-2014 15:00	03-APR-2014 15:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1407306-035	ES1407306-036	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	----	----	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		111	118	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		104	112	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		94.0	97.8	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		90.5	96.6	----	----	----
Anthracene-d10	1719-06-8	0.1	%		98.5	104	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		112	117	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		81.8	95.6	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	PARCEL 12 LOT 10 TP50	PARCEL 12 LOT 10 QA1	----	----	----
			Client sampling date / time	03-APR-2014 15:00	03-APR-2014 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1407306-035	ES1407306-036	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued								
Toluene-D8	2037-26-5	0.1	%	**83.2**	**93.3**	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	**79.9**	**88.9**	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
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	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

QUALITY CONTROL REPORT

Work Order	: **ES1407306**	Page	: 1 of 15
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 03-APR-2014
Sampler	: K.WOODS/S.CADMAN	Issue Date	: 15-APR-2014
Order number	: AS130348		
		No. of samples received	: 48
Quote number	: SY/433/13	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (QC Lot: 3378696)									
ES1407278-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	<1.0	0.0	No Limit
ES1407278-014	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	<1.0	0.0	No Limit
EA055: Moisture Content (QC Lot: 3378697)									
ES1407306-012	PARCEL 13 LOT 458 TP19	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	8.1	8.9	8.5	No Limit
ES1407368-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	<1.0	0.0	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 3381850)									
ES1407266-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.0	No Limit
ES1407302-006	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	14	15	7.6	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	48	46	4.4	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	29	28	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	46	45	3.4	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 3381852)									
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	10	10	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	6	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	15	14	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	34	36	7.7	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	17	25	38.6	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	362	354	2.3	0% - 20%
ES1407325-007	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	29	26	11.9	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	17	15	10.7	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	20	17	18.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	13	11	10.7	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	45	51	11.8	0% - 50%

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 (%)*
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3381851)									
ES1407266-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1407302-006	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3381853)									
ES1407306-012	PARCEL 13 LOT 458 TP19	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1407325-007	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3378345)									
ES1407420-003	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1407420-011	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3378345) - continued									
ES1407420-011	Anonymous	EP068: Endrin	72-20-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3378345)									
ES1407420-003	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1407420-011	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3378345) - continued									
ES1407420-011	Anonymous	EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3378351)									
ES1407306-004	PARCEL 13 LOT 460 TP4	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1407420-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	0.9	58.3	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.6	0.7	17.9	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.4	1.4	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.3	1.3	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.8	0.8	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	0.8	0.8	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	1.1	1.1	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.8	0.8	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3378351) - continued									
ES1407420-001	Anonymous	EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.6	0.6	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	7.4	8.4	12.6	0% - 50%
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	1.0	1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3377659)									
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1407368-021	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3378350)									
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1407420-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3377659)									
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES1407368-021	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3378350)									
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
ES1407420-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3377659)									
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1407368-021	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 3377659) - continued									
ES1407368-021	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 3381850)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	109	92	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	106	87	121
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	99.5	80	136
EG005T: Copper	7440-50-8	5	mg/kg	<5	32.0 mg/kg	120	93	127
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	100	86	124
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.0 mg/kg	107	93	131
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	108	81	133
EG005T: Total Metals by ICP-AES (QCLot: 3381852)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	112	92	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	110	87	121
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	103	80	136
EG005T: Copper	7440-50-8	5	mg/kg	<5	32.0 mg/kg	116	93	127
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	108	86	124
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.0 mg/kg	110	93	131
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	108	81	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3381851)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	89.6	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3381853)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	89.5	70	105
EP068A: Organochlorine Pesticides (OC) (QCLot: 3378345)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	71	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	91.2	66	122
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	69	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.1	71	115
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.2	65	113
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.9	68	116
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.6	68	118
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	87.2	68	116
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	68	120
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.5	69	119
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.7	67	121
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	85.2	66	118
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	87.6	69	117
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.4	67	123

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 3378345) - continued								
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	76	120
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	76	120
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	57.3	115
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	76.9	60	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	80.2	67	127
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	83.1	65	123
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	78.8	65	129
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3378345)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	81.3	56	126
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.7	64	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	78.4	54	122
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	74.6	64	124
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	77.4	73	117
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	83.7	55	119
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	78.6	69	123
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	75.1	70	120
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.2	71	115
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	68	114
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	81.9	68	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	82.1	69	115
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	70	118
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.7	68	116
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	64	120
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.8	68	116
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.3	70	118
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	82.4	67	123
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	82.2	42	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3378351)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	94.6	80	124
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	93.8	77	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	88.8	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	85.5	77	123
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	93.5	79	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	92.5	79	123
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	94.0	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	93.7	79	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	91.8	73	121
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	94.5	81	123
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	85.8	70	118

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3378351) - continued								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	91.9	77	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	85.2	76	122
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	82.7	71	113
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	82.2	71.7	113
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	84.6	72.4	114
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3377659)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	117	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3378350)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	87.2	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	90.5	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	82.6	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3377659)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	116	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3378350)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	85.0	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	90.0	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	72.9	63	131
EP080: BTEXN (QCLot: 3377659)								
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	108	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	107	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	104	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	106	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	97.6	62	138

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 3381850)							
ES1407266-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	97.3	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.3	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	99.5	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 3381850) - continued							
ES1407266-001	Anonymous	EG005T: Copper	7440-50-8	125 mg/kg	106	70	130
		EG005T: Lead	7439-92-1	125 mg/kg	95.1	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	86.4	70	130
		EG005T: Zinc	7440-66-6	125 mg/kg	93.8	70	130
EG005T: Total Metals by ICP-AES (QCLot: 3381852)							
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Arsenic	7440-38-2	50 mg/kg	100	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	106	70	130
		EG005T: Copper	7440-50-8	125 mg/kg	102	70	130
		EG005T: Lead	7439-92-1	125 mg/kg	104	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	97.9	70	130
		EG005T: Zinc	7440-66-6	125 mg/kg	83.9	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3381851)							
ES1407266-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	97.6	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3381853)							
ES1407306-012	PARCEL 13 LOT 458 TP19	EG035T: Mercury	7439-97-6	5 mg/kg	99.0	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 3378345)							
ES1407420-003	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	102	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	104	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	107	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	103	70	130
		EP068: Endrin	72-20-8	2 mg/kg	104	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	84.3	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3378345)							
ES1407420-003	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	101	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	78.9	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	106	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	71.3	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	82.4	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3378351)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	92.4	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3377659)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C9 Fraction	----	32.5 mg/kg	84.1	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3378350)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C10 - C14 Fraction	----	640 mg/kg	90.8	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	101	53	131

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3378350) - continued							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C29 - C36 Fraction	----	2860 mg/kg	97.2	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3377659)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	80.9	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3378350)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	112	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	98.9	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	82.0	52	132
EP080: BTEXN (QCLot: 3377659)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: Benzene	71-43-2	2.5 mg/kg	72.1	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	72.2	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	75.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	74.1	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	76.0	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	70.7	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report							
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3377659)										
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C9 Fraction	----	32.5 mg/kg	84.1	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3377659)										
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	80.9	----	70	130	----	----
EP080: BTEXN (QCLot: 3377659)										
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: Benzene	71-43-2	2.5 mg/kg	72.1	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	72.2	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	75.2	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	74.1	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	76.0	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	70.7	----	70	130	----	----
EP068A: Organochlorine Pesticides (OC) (QCLot: 3378345)										
ES1407420-003	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	102	----	70	130	----	----

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP068A: Organochlorine Pesticides (OC) (QCLot: 3378345) - continued										
ES1407420-003	Anonymous	EP068: Heptachlor	76-44-8	0.5 mg/kg	104	----	70	130	----	----
		EP068: Aldrin	309-00-2	0.5 mg/kg	107	----	70	130	----	----
		EP068: Dieldrin	60-57-1	0.5 mg/kg	103	----	70	130	----	----
		EP068: Endrin	72-20-8	2 mg/kg	104	----	70	130	----	----
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	84.3	----	70	130	----	----
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3378345)										
ES1407420-003	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	101	----	70	130	----	----
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	78.9	----	70	130	----	----
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	106	----	70	130	----	----
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	71.3	----	70	130	----	----
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	82.4	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3378350)										
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C10 - C14 Fraction	----	640 mg/kg	90.8	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	3140 mg/kg	101	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	2860 mg/kg	97.2	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3378350)										
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	112	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	98.9	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	82.0	----	52	132	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3378351)										
ES1407306-004	PARCEL 13 LOT 460 TP4	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	92.4	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.2	----	70	130	----	----
EG005T: Total Metals by ICP-AES (QCLot: 3381850)										
ES1407266-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	97.3	----	70	130	----	----
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.3	----	70	130	----	----
		EG005T: Chromium	7440-47-3	50 mg/kg	99.5	----	70	130	----	----
		EG005T: Copper	7440-50-8	125 mg/kg	106	----	70	130	----	----
		EG005T: Lead	7439-92-1	125 mg/kg	95.1	----	70	130	----	----
		EG005T: Nickel	7440-02-0	50 mg/kg	86.4	----	70	130	----	----
		EG005T: Zinc	7440-66-6	125 mg/kg	93.8	----	70	130	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3381851)										
ES1407266-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	97.6	----	70	130	----	----
EG005T: Total Metals by ICP-AES (QCLot: 3381852)										
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Arsenic	7440-38-2	50 mg/kg	100	----	70	130	----	----
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	----	70	130	----	----
		EG005T: Chromium	7440-47-3	50 mg/kg	106	----	70	130	----	----
		EG005T: Copper	7440-50-8	125 mg/kg	102	----	70	130	----	----
		EG005T: Lead	7439-92-1	125 mg/kg	104	----	70	130	----	----

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG005T: Total Metals by ICP-AES (QCLot: 3381852) - continued										
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Nickel	7440-02-0	50 mg/kg	97.9	----	70	130	----	----
		EG005T: Zinc	7440-66-6	125 mg/kg	83.9	----	70	130	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3381853)										
ES1407306-012	PARCEL 13 LOT 458 TP19	EG035T: Mercury	7439-97-6	5 mg/kg	99.0	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1407306**	Page	: 1 of 7
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 03-APR-2014
Sampler	: K.WOODS/S.CADMAN	Issue Date	: 15-APR-2014
Order number	: AS130348		
		No. of samples received	: 48
Quote number	: SY/433/13	No. of samples analysed	: 12

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 QA2, PARCEL 13 LOT 458 TP19, PARCEL 13 LOT 458 TP230	**01-APR-2014**	**----**	----	----	**07-APR-2014**	15-APR-2014	✓
Soil Glass Jar - Unpreserved (EA055-103) PARCEL 12 LOT 11 TP45	**02-APR-2014**	**----**	----	----	**07-APR-2014**	16-APR-2014	✓
Soil Glass Jar - Unpreserved (EA055-103) PARCEL 12 LOT 10 TP50, PARCEL 12 LOT 10 QA1	**03-APR-2014**	**----**	----	----	**07-APR-2014**	17-APR-2014	✓
Soil Glass Jar - Unpreserved (EA055-103) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 460 TP8, PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 QA1, PARCEL 13 LOT 459 TP12	**31-MAR-2014**	**----**	----	----	**07-APR-2014**	14-APR-2014	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 QA2, PARCEL 13 LOT 458 TP19, PARCEL 13 LOT 458 TP230	**01-APR-2014**	**09-APR-2014**	28-SEP-2014	✓	**09-APR-2014**	28-SEP-2014	✓
Soil Glass Jar - Unpreserved (EG005T) PARCEL 12 LOT 10 TP50, PARCEL 12 LOT 10 QA1	**03-APR-2014**	**09-APR-2014**	30-SEP-2014	✓	**09-APR-2014**	30-SEP-2014	✓
Soil Glass Jar - Unpreserved (EG005T) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 460 TP8, PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 QA1, PARCEL 13 LOT 459 TP12	**31-MAR-2014**	**09-APR-2014**	27-SEP-2014	✓	**09-APR-2014**	27-SEP-2014	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 QA2, PARCEL 13 LOT 458 TP19, PARCEL 13 LOT 458 TP230	**01-APR-2014**	**09-APR-2014**	29-APR-2014	✓	**10-APR-2014**	29-APR-2014	✓
Soil Glass Jar - Unpreserved (EG035T) PARCEL 12 LOT 10 TP50, PARCEL 12 LOT 10 QA1	**03-APR-2014**	**09-APR-2014**	01-MAY-2014	✓	**10-APR-2014**	01-MAY-2014	✓
Soil Glass Jar - Unpreserved (EG035T) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 460 TP8, PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 QA1, PARCEL 13 LOT 459 TP12	**31-MAR-2014**	**09-APR-2014**	28-APR-2014	✓	**10-APR-2014**	28-APR-2014	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068)								
PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	**01-APR-2014**	**07-APR-2014**	15-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 458 TP230								
Soil Glass Jar - Unpreserved (EP068)								
PARCEL 13 LOT 460 TP4,	PARCEL 13 LOT 459 TP11,	**31-MAR-2014**	**07-APR-2014**	14-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP12							
EP068B: Organophosphorus Pesticides (OP)								
Soil Glass Jar - Unpreserved (EP068)								
PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	**01-APR-2014**	**07-APR-2014**	15-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 458 TP230								
Soil Glass Jar - Unpreserved (EP068)								
PARCEL 13 LOT 460 TP4,	PARCEL 13 LOT 459 TP11,	**31-MAR-2014**	**07-APR-2014**	14-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP12							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								
Soil Glass Jar - Unpreserved (EP071)								
PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	**01-APR-2014**	**07-APR-2014**	15-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 458 TP230								
Soil Glass Jar - Unpreserved (EP071)								
PARCEL 12 LOT 11 TP45		**02-APR-2014**	**07-APR-2014**	16-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP071)								
PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	**03-APR-2014**	**07-APR-2014**	17-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP071)								
PARCEL 13 LOT 460 TP4,	PARCEL 13 LOT 459 TP11,	**31-MAR-2014**	**07-APR-2014**	14-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP12							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM))								
PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	**01-APR-2014**	**07-APR-2014**	15-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 458 TP230								
Soil Glass Jar - Unpreserved (EP075(SIM))								
PARCEL 12 LOT 11 TP45		**02-APR-2014**	**07-APR-2014**	16-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP075(SIM))								
PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	**03-APR-2014**	**07-APR-2014**	17-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP075(SIM))								
PARCEL 13 LOT 460 TP4,	PARCEL 13 LOT 459 TP11,	**31-MAR-2014**	**07-APR-2014**	14-APR-2014	✓	**08-APR-2014**	17-MAY-2014	✓
PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP12							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 TP230	PARCEL 13 LOT 458 QA2,	**01-APR-2014**	**07-APR-2014**	15-APR-2014	✓	**08-APR-2014**	15-APR-2014	✓
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 11 TP45		**02-APR-2014**	**07-APR-2014**	16-APR-2014	✓	**08-APR-2014**	16-APR-2014	✓
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	**03-APR-2014**	**07-APR-2014**	17-APR-2014	✓	**08-APR-2014**	17-APR-2014	✓
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	**31-MAR-2014**	**07-APR-2014**	14-APR-2014	✓	**08-APR-2014**	14-APR-2014	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 TP230	PARCEL 13 LOT 458 QA2,	**01-APR-2014**	**07-APR-2014**	15-APR-2014	✓	**08-APR-2014**	15-APR-2014	✓
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 11 TP45		**02-APR-2014**	**07-APR-2014**	16-APR-2014	✓	**08-APR-2014**	16-APR-2014	✓
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	**03-APR-2014**	**07-APR-2014**	17-APR-2014	✓	**08-APR-2014**	17-APR-2014	✓
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	**31-MAR-2014**	**07-APR-2014**	14-APR-2014	✓	**08-APR-2014**	14-APR-2014	✓

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(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	40	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	4	34	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	4	34	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	**5.6**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	34	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) 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	AS 3550, APHA 21st ed., 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)
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

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

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

5470-7471 5607

Fadi Soro

Fadi 17/4/14 4:45pm

From: Jacob Waugh
Sent: Thursday, 17 April 2014 4:28 PM
To: Fadi Soro
Subject: FW: ES1407306 - ASET38505 - ALS-Final Report - 16-4-14

Fadi,

Please re-batch this sample (ES1407306-008) as per the below email.

Thanks.

From: Kirsty Greenfield [mailto:kgreenfield@environcorp.com]
Sent: Thursday, 17 April 2014 2:49 PM
To: Jacob Waugh
Subject: RE: ES1407306 - ASET38505 - ALS-Final Report - 16-4-14

Hi Jacob,

I'd like to request some additional analysis for Batch ES1407306 – testing of sample Parcel 13 Lot 459 TP12 for pH and CEC.

Please let me know if that can be arranged.

Thanks,

ENVIRON

Kirsty Greenfield | Environmental Consultant
ENVIRON Australia Pty Ltd
Eastpoint Complex | Suite 19B, Level 2
50 Glebe Road | The Junction, NSW 2291
T: 02 4962 5444| F: 02 4962 5888 | M: 0407 149 176
kgreenfield@environcorp.com

From: Kate Woods
Sent: Wednesday, 16 April 2014 2:03 PM
To: Kirsty Greenfield
Subject: FW: ES1407306 - ASET38505 - ALS-Final Report - 16-4-14
Importance: High

This just came through – the revised results for asbestos for the hydro sampling I did in April.

From: Jacob Waugh [mailto:Jacob.Waugh@alsglobal.com]
Sent: Wednesday, 16 April 2014 1:27 PM
To: Kate Woods
Subject: FW: ES1407306 - ASET38505 - ALS-Final Report - 16-4-14
Importance: High

Hi Kate,

You would have received the asbestos report for work order ES1407306 this morning but a second amended version has just come through from the subcontracting lab this afternoon. The correct file is attached here in this email.

The change made on this version is listed in the email below. Sorry for any inconvenience.

Jacob Waugh

Laboratory Co-ordinator
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

T +61 2 8784 8555
F +61 2 8784 8500

www.alsglobal.com

From: Australian Safer Environment and Technology [mailto:aset@bigpond.net.au]
Sent: Wednesday, 16 April 2014 11:58 AM
To: subresults syd
Cc: Jacob Waugh
Subject: ES1407306 - ASET38505 - ALS-Final Report - 16-4-14
Importance: High

Dear Jacob

Please forward this amended report for the report issued late in the afternoon yesterday.

Sample #23 was missing the weights and sorry for any inconvenience caused.

Thanks & regards

Mahen De Silva - BSc, MSc, Grad Dip (Occ Hyg)
Occupational Hygienist.

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

SUITE 710 / 90 GEORGE STREET, HORNSBY NSW 2077 - P.O. BOX 1644 HORNSBY WESTFIELD NSW
PHONE: (02) 99872183 FAX: (02)99872151 EMAIL: aset@bigpond.net.au

CERTIFICATE OF ANALYSIS

Work Order	: **ES1408784**	Page	: 1 of 3
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: AS130348		
C-O-C number	: ----	Date Samples Received	: 17-APR-2014
Sampler	: KW/SC	Issue Date	: 30-APR-2014
Site	: ----		
		No. of samples received	: 1
Quote number	: SY/433/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics

General Comments

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

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

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

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

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

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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	PARCEL 13 LOT 459 TP12	----	----	----	----
			Client sampling date / time	01-APR-2014 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1408784-001	----	----	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**4.9**	----	----	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	**13.4**	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	**0.7**	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	**0.6**	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	<0.1	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	**14.7**	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1408784**	Page	: 1 of 4
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 17-APR-2014
Sampler	: KW/SC	Issue Date	: 30-APR-2014
Order number	: AS130348		
		No. of samples received	: 1
Quote number	: SY/433/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics

General Comments

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

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 3404776)									
ES1408528-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	3.8	3.7	0.0	0% - 20%
ES1408791-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	3.2	3.6	12.3	0% - 20%
ED008: Exchangeable Cations (QC Lot: 3403160)									
ES1408782-001	Anonymous	ED008: Exchangeable Calcium	----	0.1	meq/100g	4.6	4.6	0.0	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	0.3	0.2	0.0	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.0	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.0	0% - 20%
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	4.9	4.9	0.0	0% - 20%

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) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED008: Exchangeable Cations (QCLot: 3403160)								
ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1 meq/100g	109	90	128
ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.67 meq/100g	104	86	120
ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.51 meq/100g	120	85	135
ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.87 meq/100g	108	86	128
ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----

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.

- **No Matrix Spike (MS) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1408784**	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 17-APR-2014
Sampler	: KW/SC	Issue Date	: 30-APR-2014
Order number	: AS130348		
		No. of samples received	: 1
Quote number	: SY/433/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
PARCEL 13 LOT 459 TP12	**01-APR-2014**	**24-APR-2014**	08-APR-2014	×	**24-APR-2014**	24-APR-2014	✓
ED008: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED008)							
PARCEL 13 LOT 459 TP12	**01-APR-2014**	**24-APR-2014**	29-APR-2014	✓	**24-APR-2014**	29-APR-2014	✓

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(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Exchangeable Cations with pre-treatment	ED008	1	3	**33.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Exchangeable Cations with pre-treatment	ED008	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Exchangeable Cations with pre-treatment	ED008	1	3	**33.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Exchangeable Cations with pre-treatment	ED008	SOIL	Rayment & Higginson (1992) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)						
Soil Glass Jar - Unpreserved						
PARCEL 13 LOT 459 TP12	24-APR-2014	08-APR-2014	**16**	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Appendix F

QA/QC Assessment

APPENDIX F

DATA QUALITY OBJECTIVES

To ensure that reliable data of adequate type was collected and assessed for the investigation, the seven-step Data Quality Objective (DQO) approach, endorsed in the NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme 2nd Edition, will be adopted. The DQOs set quality assurance and quality control parameters for the field and laboratory programs to ensure data of appropriate reliability will be used to assess the environmental conditions at Parcel 13.

ENVIRON has developed DQOs in accordance with the seven-step process, which is presented below.

Step 1 – State the Problem

Based on the information available from the Phase 1 ESA, uses of Parcel 13 include rural residential landuse, including poultry farming, from the 1970s to the present day. These uses of Parcel 13 require confirmation via a site walkover. In addition, the potential for fluoride in surface soils from dust deposition from the Hydro smelter requires assessment.

Step 2 – Identification of the Goals (Decisions) of the Study

The following decisions are to be made from this study:

- Are the current and former uses of Parcel 13 consistent with site observations?
- Has Parcel 13 been impacted by fluoride from dust deposition from the Hydro smelter?
- Has Parcel 13 been impacted by other contaminants?
- Is Parcel 13 suitable for low rural residential landuse?

Step 3 – Identify Information Inputs to the Decision or Goal of the Study

The inputs required to make the above decisions as listed below:

- A site walkover, including collection of field notes and photographs;
- Results of surface soil samples collected for fluoride analysis;
- Results of other soil samples from fill/ hummocky ground collected for suitable analysis during the site walkover;
- Proposed land use;
- Appropriate NSW contamination guidelines.

Step 4 – Define the Study Boundaries

Spatial boundaries - the study boundaries have been defined as the spatial boundary of Parcel 13, as shown on Figure 1.

Vertical boundaries – as areas of concern at Parcel 13 are restricted to surface soils, the vertical boundary of the study is the top 200mm unless subsurface contamination issues are identified during the site walkover.

Temporal boundaries – the temporal boundary is limited to the data collected during the investigation works.

Constraints within the study boundaries – This investigation does not require investigation of subsurface soils or groundwater.

Step 5 – Develop a Decision Rule

The decision rules for this investigation are as follows:

- If it is determined that the data generated through this investigation is reliable for use in producing a site conceptual model and assessing the suitability of Parcel 13 for low rural residential landuse, then an assessment of the suitability of Parcel 13 for low rural residential landuse will be made;
- If it is determined that the data generated through this investigation is not suitable, comprehensive or reliable for use in producing a site conceptual model, then further investigations may be recommended prior to the development of a site conceptual model and assessment of the suitability of Parcel 13 for low rural residential landuse.

Step 6 – Specify Performance or Acceptance Criteria that the Data need to Achieve

Acceptable limits on decision errors have been developed based on the Data Quality Indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness. The DQIs for this investigation are outlined below.

The potential for significant decision errors were minimized by:

- Completion of a QA/QC assessment of the investigation data to assess if the data satisfies the DQIs;
- Assessment of whether appropriate sampling and analytical densities were completed for the purpose of the investigation; and
- Ensuring that the criteria set for the investigation were appropriate for the proposed use of Parcel 13.

Minimization of the potential for significant decision errors limits the potential that a conclusive statement may be incorrect.

Step 7 – Optimisation of the Design of Collection of Data

The collection of data was optimized by the completion of a Phase 1 ESA, data gap review and development of a sampling strategy. Attainment of the DQOs has been assessed by reference to the DQIs, presented below.

DATA QUALITY INDICATORS

The project Data Quality Indicators (DQIs) have been established to set acceptance limits on field and laboratory data collected as part of this investigation. Field and laboratory procedures acceptance limits are set at different levels for different projects and by different laboratories. Non-compliances with acceptance limits are to be documented and discussed in the report. The DQIs are presented in Table A.

Table A: Data Quality Indicators

DQI	Field	Laboratory	Acceptability Limits
Completeness	All critical locations sampled All samples collected Experienced sampler Documentation correct	All critical samples analysed and all analytes analysed according to Standard Operating Procedures (SOPs) Appropriate Practical Quantitation Limits (PQLs) Sample documentation complete Sample holding times complied with	As per NEPM (2013)
Comparability	Experienced sampler In the event of multiple sampling events: Same types of samples collected Same sampling methodologies used Climatic conditions	Same analytical methods used Same PQLs Same units Same primary and secondary laboratories	As per NEPM (2013)
Representativeness	Appropriate media sampled Relevant media sampled	All samples analysed according to SOPs	
Precision	Collection of duplicate samples Sampling methodologies appropriate and complied with	Analysis of: Blind duplicate samples at rate of 1 in 10 samples Split duplicate samples at rate of 1 in 20 samples Laboratory duplicate samples	 RPD of 30 to 50% RPD of 30 to 50% RPD of 30 to 50%
Accuracy	Sampling methodologies appropriate and complied with.	Analysis of: Method blanks Matrix spikes Surrogate spikes Laboratory control samples Reagent blanks Reference material	 Non-detect 70 to 130% 70-130% 70 to 130%

QUALITY ASSURANCE AND QUALITY CONTROL

A quality assurance assessment for this report is presented in Table A and B below. An assessment was made of data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations, as outlined in NSW DEC (2006) and NSW EPA (2007) guidelines.

Table A: QA/QC – Sampling and Analysis Methodology Assessment

Sampling Methodology	ENVIRON Assessment
Sampling Pattern and Locations	Surface soil sampling was undertaken on a grid pattern across the site to assess the impact of particulate fallout from Hydro Aluminium Smelter. Sampling of fill material was completed on a targeted basis.
Sampling Density	Six soil samples were collected from a grid across the entire site which is approximately 20 ha. The purpose of the sampling was to assess for impacts from smelter particulate fallout and therefore is considered suitable in density and spatial layout. Twenty six representative soil samples were collected from test pits that encountered fill. Given the homogeneous nature of the fill and its limited vertical distribution, this sampling density is considered adequate.
Sample depths	Surface soil samples were collected from a grid across the entire site from surface soils. Fill soil samples were collected from within 2.7m of the ground surface, which constitutes the maximum depth of fill.
Sample Collection Method	Surface soil samples across Parcel 13 were collected directly from the ground surface using using dedicated disposable gloves and a hand trowel. The hand trowel was brushed clean prior to sample collection. Soil samples were collected into laboratory supplied, acid rinsed glass jars. Fill soil samples were collected from the centre of the back hoe bucket using dedicated disposable gloves. Soil samples were collected into laboratory supplied, acid rinsed glass jars.
Decontamination Procedures	Surface soil samples across Parcel 13 were collected directly from the ground surface using using dedicated disposable gloves and a hand trowel. The hand trowel was brushed clean prior to sample collection. As fill soil samples were collected from the centre of the back hoe bucket, decontamination of the back hoe was not required.
Sample handling and containers	All soil samples were placed into laboratory-supplied paper bags. Soil and water samples were placed on ice following collection and during transportation to the laboratory.
Chain of Custody	Samples were transported to the laboratory under chain of custody conditions. The chain of custody forms were signed by the laboratory on receipt of the samples.
Detailed description of field	Field screening for volatiles was not completed during soil

Table A: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling Methodology	**ENVIRON Assessment**
screening protocols	sampling as volatile contaminants were not the main chemical of concern.
Calibration of field equipment	Field equipment requiring calibration was hired from a rental company who calibrated the equipment prior to hire.
Sampling Logs	The lithology of surface soil samples was documented on the field information sheets, which are included in Appendix C.

Table B: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**ENVIRON Comments**
Field quality control samples	Three intra-laboratory duplicate soil sample was collected at Parcel 13 during the fill soil sampling, with duplicates collected at a rate of one per 10 primary samples. No rinsate blank samples were collected.
Field quality control results	The Relative Percent Differences (RPDs) between the primary and duplicate pair were less than 50% for all analytes.
NATA registered laboratory and NATA endorsed methods	ALS was used as the primary laboratory. ALS laboratory certificates are NATA stamped and the lab is accredited for the analyses performed for this assessment.
Analytical methods	A summary of analytical methods were included in the laboratory test certificates.
Holding times	Review of the COCs and laboratory certificates indicate that holding times were met.
Practical Quantitation Limits (PQLs)	PQLs for all soil analytes were below Parcel 13 assessment criteria.
Laboratory quality control samples	Laboratory quality control samples including duplicates, laboratory control samples, matrix spikes, surrogate spikes and blanks were undertaken by the laboratories at appropriate frequencies.
Laboratory quality control results	All results for laboratory soil duplicates, laboratory control samples, matrix spikes and surrogates were acceptable and no detections were made in blank samples.

Overall it is considered that the completed investigation works and the data obtained adequately complied with the requirements of NSW DEC (2006) and NSW EPA (2007) guidelines and that the data is of suitable quality to meet the project objectives.

Appendix G

Hazardous Materials Audit

Hazardous Materials Audit
Parcel 13

Prepared for:
Hydro Aluminium Kurri Kurri Pty Limited

Prepared by:
ENVIRON Australia Pty Ltd

Date:
August 2014

Project Number:
AS130348

ENVIRON

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VERSION CONTROL RECORD

Document File Name	**Date Issued**	**Version**	**Author**	**Reviewer**
Parcel 13 Draft Hazardous Materials Audit	15 August 2014	Draft 1	S Taylor	F Robinson

Contents

Acronyms and Abbreviations

ACM:	Asbestos containing material
EMP:	Employment Parcel
LBP:	Lead based paint
PCB:	Polychlorinated biphenyl compounds
SMF:	Synthetic mineral fibre

1 Introduction

ENVIRON Australia Pty Ltd (ENVIRON) was engaged by Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) to undertake a hazardous materials audit of the buildings located within Parcel 13, within the buffer zone of the former Hydro Aluminium smelter at Kurri Kurri, NSW.

1.1 Objectives and Scope of Work

The survey was undertaken in order for Hydro Aluminium to effectively manage its compliance obligations with respect to asbestos containing materials (ACM), and to identify and manage risks associated with other hazardous materials potentially present in the buildings to an acceptable level.

Hazardous materials other than ACM were polychlorinated biphenyl compounds (PCB), synthetic mineral fibre (SMF), and lead based paint (LBP).

1.2 Legislative Requirements, Standards and Codes of Practice

In NSW, management of asbestos is governed by the following principal legislation and guidance documents:

- Workplace Health and Safety Regulation 2011 (Part 8)
- *Code of Practice for the Management and Control of Asbestos in Workplace* (NOHSC, 2005a).
- *NOHSC Code of Practice for the Safe Removal of Asbestos 2nd Edition* (NOHSC, 2005b).

The following codes of practice and standards apply to the other hazardous materials:

- *National Code of Practice for the Safe Use of Synthetic Mineral Fibres* (NOHSC, 1990).
- *Identification Of PCB-Containing Capacitors* (ANZECC, 1997).
- Australian Standard *AS4361.2 Guide to Lead Paint Management – Residential and Commercial Buildings*.

1.3 Survey Methodology

The hazardous materials survey was undertaken of structures within Parcel 13.

The survey methodology involved the following:

- An inspection of the accessible sections of the outside and inside of all buildings, as well as any accessible power boxes on power poles within the properties.
- Wherever possible, confirmation of the presence or absence of asbestos in a material was via identification in the field.
- Where the presence or absence of asbestos could not be determined in the field, a sample was taken for laboratory analysis.
- The age of the building and the condition of any fluorescent lights was observed and the likelihood for them to contain PCB noted.
- Visual confirmation of SMF.
- The age of the building and the condition of the paint was observed and the likelihood of lead-based paint being present noted.

1.4 Survey Limitations

Any restrictions or limitations on the survey, such as access not gained to areas or areas not accessible due to safety restrictions, are outlined in Section 2.2 of this report. The reader is also referred to ENIVRON's limitations in Appendix Section 6.

2 Surveys Details

2.1 Buildings Descriptions

The hazardous materials survey was undertaken on 11 November 2013, 10 June 2014 and 16 June 2014 by ENVIRON Senior Environmental Scientist Shaun Taylor.

Table 1 describes the following:

- The building type (such as residential home, shed, garage).
- Main construction materials used in construction of the building.
- An estimate as to whether the structure was build prior to 1990 (1990 is commonly regarded as a 'cut-off date' for asbestos in construction materials. It is also a good indicator as to the likelihood of PCBs being used in fluorescent lighting capacitors).
- Any areas not accessible within the building.

A total of 14 buildings within six properties were inspected for hazardous materials.

2.2 Survey Methodology

The methodology undertaken for the survey is described as follows.

Develop Project OHS Plan, and Survey Protocol and Survey Templates

A Health and Safety Plan was developed for the contamination and hazardous materials investigations within the buffer zone in advance of the works commencing and endorsed internally.

A hazardous materials protocol and data collection template specific to the project was developed, to ensure a consistent approach to the surveys and data collection.

Project Scheduling and Communications

Tenants' contact details were provided by Hydro and a scheduled date for the survey agreed to between ENVIRON and the tenant. Each tenant was notified of the survey program and process by Hydro (via the real estate agent) in advance. Prior to the scheduled date, ENVIRON contacted the tenant to confirm the date, arrival time, and any likely access issues or restricted areas.

Conduct Hazardous Materials Survey

The survey included a thorough visual inspection of all accessible areas of the buildings and structures, and collection of representative samples for the purpose of analytical confirmation where materials could not be visually identified.

As the majority of houses were inhabited by tenants, some areas (such as the ceiling cavity) were inaccessible due to the location of furniture and appliances. For this reason sampling of some material was also not appropriate as it would require disturbance of material that was not damaged.

Data Collection

Survey data collected included the type, form, location, extent/ quantity, condition and accessibility of ACM and synthetic mineral fibre products, the likely presence of PCB in fluorescent light fittings, and the likely presence of LBP. Photographs were also taken of the observed potential/ confirmed hazardous materials.

In addition, any other observations of concern (such as potential for contamination in the surrounding area) were documented.

Sample Analysis

Any asbestos sample analysis was undertaken using polarised light microscopy, in conjunction with dispersion staining techniques. Where possible, the presence of asbestos (but not the type of asbestos) was confirmed in the field.

SMF and PCB were visually identified during the surveys. The presence of lead in paint was assumed based on the likely age of the building and the condition of painted surfaces.

Areas not Accessed

During the audit, all areas of the buildings and structures within the area which were both readily accessible and safe to access were inspected. Where access was not available to areas which could potentially hazardous materials, the locations and the reasons inaccessibility were noted. Any areas not accessed are documented within Table 1.

Other Observations

In addition to the survey of structures within the property, the surveyor also noted potential issues of concern, such as:

- Evidence of subsurface hazardous materials (such as ACM service conduits).
- Evidence of hazardous material fragments/ waste in soils or elsewhere within the property.
- Other potential issues of concern (such as possible soil contamination).

2.3 Sample Collection and Laboratory Analysis

During the survey one sample was collected and analysed for the presence of asbestos (all forms) at a NATA accredited asbestos identification facility. The results of the analysis is summarised in Section 3, with the supporting laboratory analytical certificate contained in Appendix C.

The remaining ACM were confirmed through visual confirmation of the presence of asbestos (but not the type of asbestos) in the field.

Table 1: Hazardous Materials Audit Building Details				
Property	**Building Type/s**	**Main Construction Materials**	**Estimated Pre or Post 1990 construction**	**Any Inaccessible Areas**
Parcel 13				
8 Bowditch Avenue	House	Cement sheeting Corrugated iron Timber Brick Concrete	Pre-1990	Ceiling and wall cavities
	Garage	Cement sheeting Corrugated iron Timber Concrete	Pre-1990	Ceiling and wall cavities
	Shed	Cement sheeting Corrugated iron Timber Concrete	Pre-1990	Ceiling and wall cavities
10 Bowditch Avenue	Shed	Corrugated iron Timber Concrete Metal	Pre-1990	N/A
12 Bowditch Avenue	House	Cement sheeting Roof tiles Timber Brick Concrete	Pre-1990	Ceiling and wall cavities
	Garage	Cement sheeting Corrugated iron Timber Brick Concrete	Pre-1990	Inside garage

Table 1: Hazardous Materials Audit Building Details				
Property	**Building Type/s**	**Main Construction Materials**	**Estimated Pre or Post 1990 construction**	**Any Inaccessible Areas**
Parcel 13				
14 Bowditch Avenue	House	Timber Brick Concrete Cement sheeting Roof tiles Plasterboard	Pre-1990	Ceiling and wall cavities
	Shed	Timber Brick Concrete	Pre-1990	N/A
16 Bowditch Avenue	House	Cement sheeting Corrugated iron Brick and concrete Plasterboard	Pre-1990	Ceiling and wall cavities
	Shed	Cement sheeting Corrugated iron Timber Concrete	Pre-1990	Inside shed
18 Bowditch Avenue	Chicken sheds (x2)	Cement sheeting Corrugated iron	Pre-1990	Shed interiors (sheds were stocked)
	House	Cement sheeting Cement sheeting panels (hardplank) Corrugated iron Brick and concrete Plasterboard	Pre-1990	Ceiling and wall cavities
	Doghouse	Cement sheeting Corrugated iron Timber	Pre-1990	N/A

Table 1: Hazardous Materials Audit Building Details				
Property	**Building Type/s**	**Main Construction Materials**	**Estimated Pre or Post 1990 construction**	**Any Inaccessible Areas**
Parcel 13				
	Open garage/ carport	Corrugated iron Timber	Pre-1990	N/A

3 Findings

3.1 Hazardous Materials Register

The results of the survey are presented in Appendix B.

The following provides a summary of the hazardous materials identified. Representative photographs of the identified hazardous materials are provided in Appendix A.

3.2 Asbestos Containing Materials

Asbestos cement sheeting was found in the following locations:

- 8 Bowditch Avenue: ACM sheeting was used throughout the exterior and interior of the house and garage on the property: in the majority of internal walls and ceilings of the house; and to all the external walls and eaves.
- 12 Bowditch Avenue: ACM sheeting was used in the exterior and interior of the house and garage on the property: in some of the internal walls and ceilings of the house; and to the external walls and eaves.
- 14 Bowditch Avenue: ACM sheeting was used in the exterior and interior of the house on the property: in some of the internal walls and the kitchen ceiling of the house; and to the exterior of the downer windows on the first floor.
- 16 Bowditch Avenue: ACM sheeting was used in the exterior and interior of the house and garage on the property: in some of the internal walls and ceilings of the house; and to the external walls and eaves.
- 18 Bowditch Avenue: ACM sheeting was used throughout the exterior and interior of the house and chicken sheds on the property: in some of the internal walls and ceilings of the house; the external walls and eaves of the house; and the exterior walls of the chicken sheds.

Four samples was collected for laboratory analysis. Three were taken at t18 Bowditch Avenue: one from a doghouse (no asbestos was detected); one from the southern chicken shed (asbestos detected), and the exterior wall panels to the house (asbestos detected). One sample was taken at 16 Bowditch Avenue: from the walls and ceiling to the enclosed back verandah (asbestos detected). The laboratory certificates are presented in Appendix C.

3.3 Synthetic Mineral Fibre Materials

No SMF were observed. However, the ceiling and wall cavities of the houses and some garages could not be accessed, and there is potential that SMF was used as insulation in these spaces.

3.4 Polychlorinated Biphenyls

Due to the age of the buildings and likely age of the light fittings, there is potential that the fluorescent lights observed in the structures within Parcel 13 have capacitors that contain PCBs.

3.5 Lead Based Paint

- The vast majority of the exterior paints (which could potentially be LBP) were applied to ACM. Therefore:
  - In the event that the building is to be demolished, these materials would be managed in accordance with **Section 4.1.2** as asbestos containing materials. These management procedures are considered appropriate for LBP.
  - If the building is to be retained and surfaces repainted, no abrasion (mechanical or manual) should be applied to these surfaces. This is required to avoid both the generation of airborne asbestos fibres and potentially lead bearing particles.
- Abrasion should not be used on any of the remaining paint on non-asbestos containing material surfaces to avoid the potential generation of lead bearing particles without previously testing to confirm that LBP are absent.
- In the event that the building is demolished, the PPE to be worn when managing ACM and SMF would appropriately protect demolition personnel from LBP.

3.6 Other Observations

In addition to the hazardous materials observed in the buildings within the parcel, the following potential issues of concern were also identified:

- Drums and other wastes were located in the west of 18 Bowditch Avenue.
- In addition to the filling undertaken to facilitate construction of the chicken sheds, there were hummocks that appeared to be from fill or buried materials at locations within 18 Bowditch Avenue.

4 Recommendations

The following are general management measures to be implemented for hazardous materials management, either in the event that the building is to be retained and occupied, or the building is to be demolished.

4.1 Asbestos Containing Materials

4.1.1 Building Maintenance/ Retention

- The majority of ACM do not pose a health risk provided they are not subjected to damage or inappropriate alteration. However some of the ACM identified pose a health risk due to their poor condition and location. This includes the exterior wall linings of the chicken sheds at 18 Bowditch Avenue; and much of the ACM sheeting at 8 Bowditch Avenue

- Damaged ACM should be removed and replaced. Where damage is minor (such as minor cracks, drilled holes or worn edges to sections of the walls and ceilings within the former dairy shed and to laundry walls to the house) any cracks should be sealed with a PVA glue and painted (no sanding of materials prior to painting) as a temporary measure. However it is recommended that a program for removal of these materials also be developed and implemented.
- A copy of the asbestos and hazardous materials register is to be kept at the Hydro Aluminium Smelter and made available to employees or contractors undertaking work on the buildings.
- No sanding, blasting, drilling, or similar abrasive activity is to be undertaken on any identified ACMs.
- The *National Code of Practice for the Management and Control of Asbestos in Workplaces* recommends, and the Work Health and Safety Regulation 2011 requires, labelling of any identified ACM in the workplace where practicable.

  While such labelling is not required in a rental property under the regulation (and notification of tenants on the presence of asbestos is not required by the NSW Department of Fair Trading), Hydro should consider labelling the ACM.
- If installed, periodically reinspect asbestos warning labels so that they are legible and in good condition.
- In the event that any of the ACM is damaged while the buildings are still occupied by tenants, the material should be immediately removed.
- As the chicken sheds are a workplace, Hydro should advise the tenants of 18 Bowditch Avenue of the presence of ACM, particularly those in locations where it is easily accessible and more likely to be damaged or impacted (such as the walls) or has already been damaged (such as the upper panels to the side of walls of the chicken sheds). They would then be required to manage the asbestos in accordance with the Work Health and Safety Regulation 2011.

4.1.2 Building Demolition

- If demolition or refurbishment works are to be undertaken, samples should be taken for analysis of those materials noted as “assumed” as ACM in the register (refer to Section 2.2 as to why some materials were not sampled). Areas that were inaccessible should also be examined to confirm if any ACM is present.
- If necessary due to demolition or refurbishment works, remove identified ACMs under controlled condition using an appropriately licensed removal contractor.
- Any asbestos work is carried out in accordance with the *Code of Practice for the Management and Control of Asbestos in the Workplace [NOHSC: 2018 (2005)].*
- Ensure appropriately licenced removalists are used for any planned removal, and that any removal works are undertaken in accordance with the *NOHSC Code of Practice for the Safe Removal of Asbestos 2nd Edition [NOHSC:2002(2005)].*

4.2 Synthetic Mineral Fibre Materials

- Apply caution when entering ceiling voids and ensure contractors or persons entering ceiling voids or performing work on synthetic mineral fibre materials wear appropriate PPE, particularly if they have breathing disorders such as asthma.
- Remove any SMF debris as part of routine site housekeeping.
- Ensure contractors or persons performing work on SMF materials adhere to the guidelines outlined in the *National Code of Practice for Synthetic Mineral Fibres [NOHSC 1004 (1990)], May 1990*; and the *Industry code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation Products, April, 2003.*

4.3 Polychlorinated Biphenyls

- Undamaged capacitors (containing PCBs) are unlikely to pose a health risk. Therefore they are unlikely to pose a risk if they remain in-situ.
- In the event that the light fittings are to be removed, and it is confirmed that the capacitors contain PCBs, the requirements of the *Identification Of PCB-Containing Capacitors* should be implemented for removal, temporary storage, transportation and disposal.

4.4 Lead Based Paint

- The majority of the exterior paints (which are the most likely to be LBP) were applied to ACM. Therefore:
  - In the event that the building is to be demolished, these materials would be managed in accordance with **Section 4.1.2** as asbestos containing materials.
  - If the building is to be retained and surfaces repainted, no abrasion (mechanical or manual) should be applied to these surfaces. This is required to avoid both the generation of airborne asbestos fibres and potentially lead bearing particles.
- Abrasion should not be used on any of the remaining paint on non-asbestos containing material surfaces to avoid the potential generation of lead bearing particles without previously testing to confirm that LBP are absent.

- In the event that the building is demolished, the PPE to be worn when managing ACM and SMF would be appropriately protect demolition personnel from LBP.

5 References

Australian and New Zealand Council Environment Conservation Council (ANZECC). 1997. “Identification Of PCB-Containing Capacitors”.

National Occupational Health and Safety Council. (NOHSC). 1990. “National Code of Practice for the Safe Use of Synthetic Mineral Fibres”.

National Occupational Health and Safety Council. (NOHSC). 2005a. “Code of Practice for the Management and Control of Asbestos in Workplace.

National Occupational Health and Safety Council. (NOHSC). 2005b. “Code of Practice for the Safe Removal of Asbestos 2nd Edition”.

Standards Australia. 1998. “AS4361.2 Guide to Lead Paint Management – Residential and Commercial Buildings”

6 Limitations

ENVIRON Australia prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Kurri Kurri Pty Limited dated 18 September 2013 and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken as part of this investigation, based on past and present known uses of the site. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous.

Site conditions may change over time. This report is based on conditions encountered at the site at the time of the report and ENVIRON disclaims responsibility for any changes that may have occurred after this time.

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

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

6.1 General Limitations regarding Sampling

It is not always possible to locate all hazardous materials in the course of an inspection, due to factors such as:

- Restrictions on access to internal construction components and other inaccessible parts of structures.
- Restrictions to access due to presence of tenant's belongings.
- The need to avoid damage in occupied buildings, such as when attempting to inspect behind wall panels or under carpets.
- Minimising inconvenience when premises are occupied or are in use whilst an inspection is being conducted.
- The availability of building/plant construction plans.

6.2 User Reliance

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

Figures

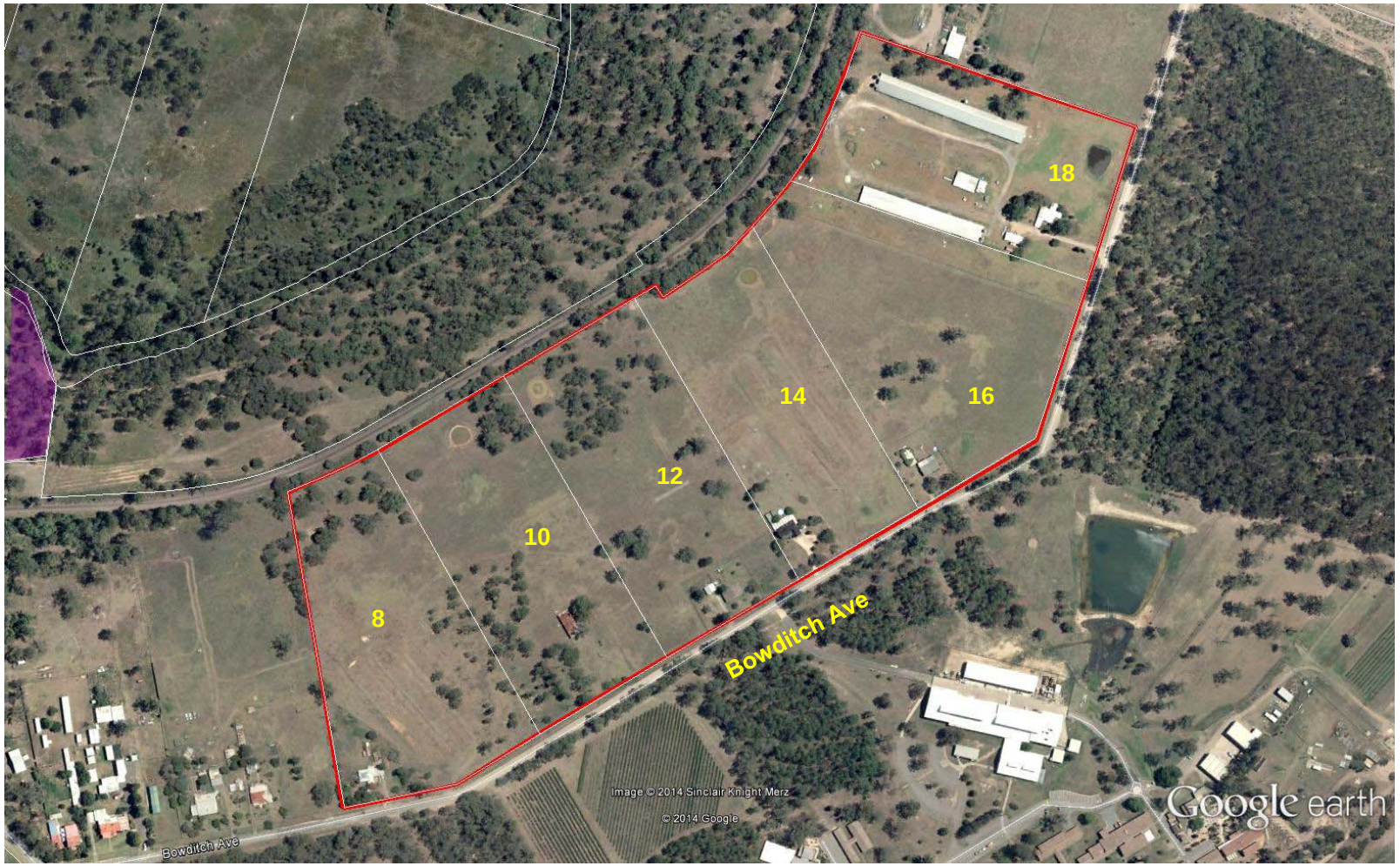

Figure 1. Parcel 13

Appendix A

Photographs

Photo 1: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the southern chicken shed

Photo 2: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the southern chicken shed. Note varying sized fragments in the adjacent soils

Photo 3: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the northern chicken shed

Photo 4: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the northern chicken shed

Photo 5: 18 Bowditch Avenue – zelemite electrical backing board

Photo 6: 18 Bowditch Avenue – example of ACM panels to the exterior of the house

Photo 7: 18 Bowditch Avenue - example of ACM sheeting used for eaves to the house

Photo 8: 18 Bowditch Avenue - photo showing the two forms of ACM sheeting within the shower area (separate to bathroom)

Photo 9: 18 Bowditch Avenue - example of ACM sheeting walls in bathroom

Photo 10: 18 Bowditch Avenue - ACM sheeting fragments in space below house floor

Photo 11: 8 Bowditch Avenue - fluorescent light in front room to the house

Photo 12: 8 Bowditch Avenue - Example of AC sheeting lining to wall in front (western) room to the house

Photo 13: 8 Bowditch Avenue - section of AC sheeting lining to wall and ceiling to bedroom adjacent to the front (western) room of the house

Photo 14: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the front (eastern) room of the house

Photo 15: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to hallway off living room in the house

Photo 16: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the living room in the house. Also shown is a fluorescent light that is assumed to have a capacitor containing PCBs

Photo 17: 8 Bowditch Avenue - AC sheeting (including the floral patterned sections) lining the walls, ceiling and shower partition to the bathroom of the house.

Photo 18: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the kitchen of the house.

Photo 19: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the back room of the house.

Photo 20: 8 Bowditch Avenue - section of AC sheeting lining the exterior walls to the house

Photo 21: 8 Bowditch Avenue - section of the AC sheeting used in the eaves to the house.

Photo 22: 8 Bowditch Avenue - section of corrugated AC sheeting used as infill panel near the steps to the side entry to the house.

Photo 23: 8 Bowditch Avenue - Section of the AC sheeting lining the walls to the garage.

Photo 24: 8 Bowditch Avenue - Section of the damaged AC sheeting lining the walls to the shed.

Photo 25: 8 Bowditch Avenue - fluorescent light and AC sheeting lining the ceiling in the front (south) room of the shed.

Photo 26: 12 Bowditch Avenue – ACM panels to the exterior walls of the house

Photo 27: 12 Bowditch Avenue – ACM sheeting used in the eaves of all sides to the house

Photo 28: 12 Bowditch Avenue - one of the gable ends to the sides of the house constructed of ACM sheeting.

Photo 29: 12 Bowditch Avenue – Zelemite backing board to the older power box on the house

Photo 30: 12 Bowditch Avenue – ACM sheeting lining the walls to the toilet room in the rear of the house

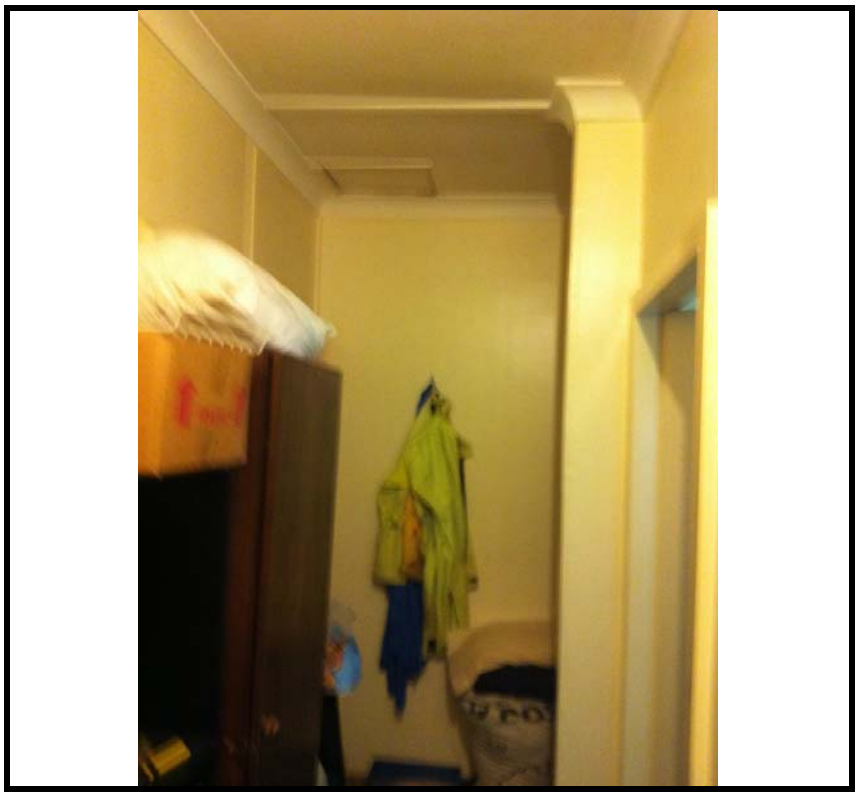

Photo 31: 12 Bowditch Avenue – ACM sheeting lining the walls and ceiling to the laundry in the house

Photo 32: 12 Bowditch Avenue – Fluorescent light to the ceiling in the kitchen of the house

Photo 33: 12 Bowditch Avenue – A section of the ACM sheeting lining the exterior of the garage

Photo 34: 12 Bowditch Avenue – Some of the ACM sheeting fragments The large white fragments and many of the smaller white fragments) near the front gate

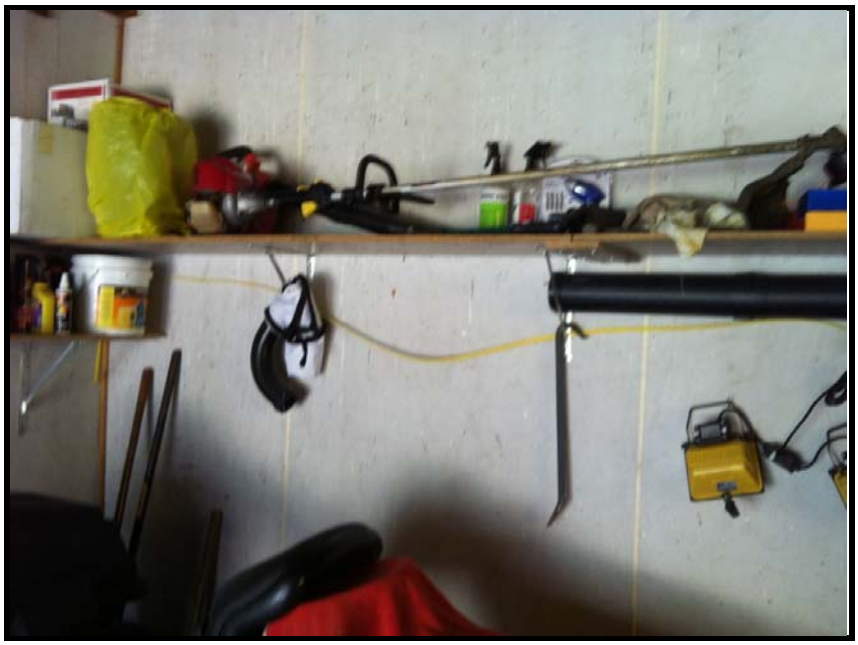

Photo 35: 14 Bowditch Avenue – ACM sheeting lining to rear wall of garage to house

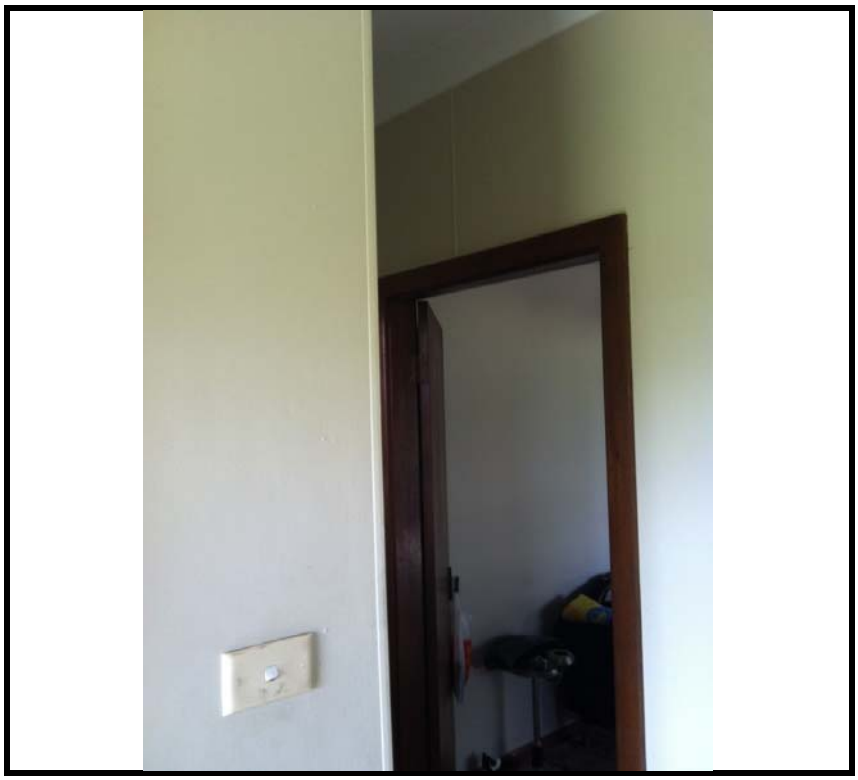

Photo 36: 14 Bowditch Avenue –Section of the ACM sheeting lining the walls to the laundry in the house, showing the section in front of the bathroom.

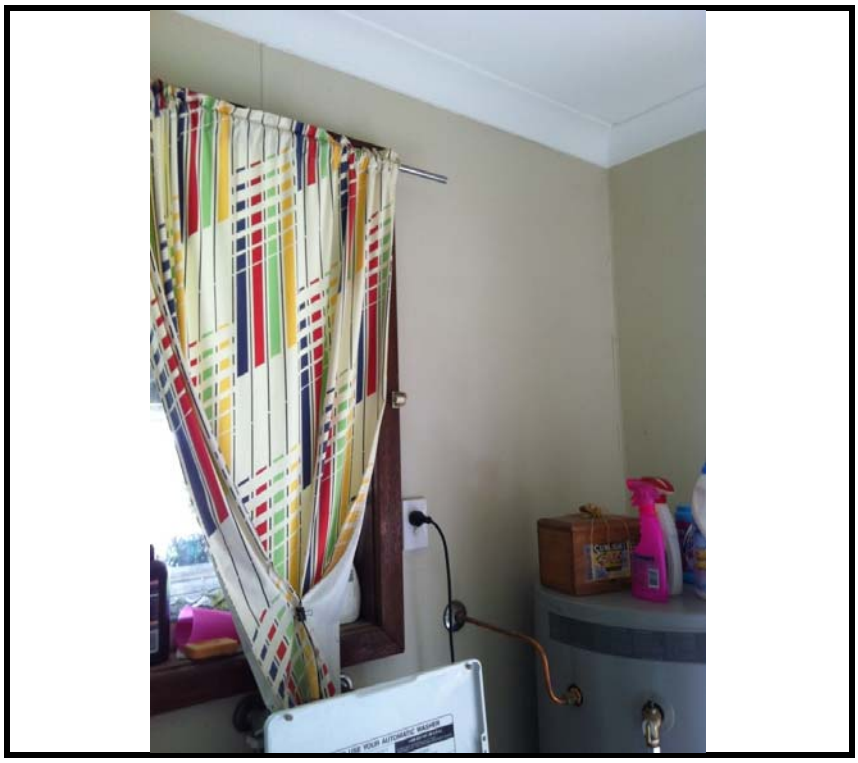

Photo 37: 14 Bowditch Avenue – Section of the ACM sheeting lining the walls to the laundry in the house

Photo 38: 14 Bowditch Avenue – ACM sheeting to the walls of the ground floor bathroom of the house

Photo 39: 14 Bowditch Avenue – ACM square panels use in false ceiling above the kitchen in the house.

Photo 40: 14 Bowditch Avenue – one of the two fluorescent lights in the first floor living room

Photo 41: 14 Bowditch Avenue – Painted and tiled ACM sheeting lining the walls in the first floor bathroom of the house

Photo 42: 14 Bowditch Avenue – Painted and tiled ACM sheeting lining the walls in the first floor ensuite

Photo 43: 14 Bowditch Avenue – ACM panelling used in the side walls and eaves to first floor dormer windows at the rear of the house

Photo 44: 14 Bowditch Avenue – ACM sheeting lining the underside to the ground floor awning of the house

Photo 45: 14 Bowditch Avenue – ACM square panels (appear to be as use in false ceiling above the kitchen in the house) on the ground in the shed at rear of the house.

Photo 46: 16 Bowditch Avenue – ACM sheeting (blue patterned) in the toilet room of the house

Photo 47: 16 Bowditch Avenue – ACM sheeting lining the walls of the bathroom in the house

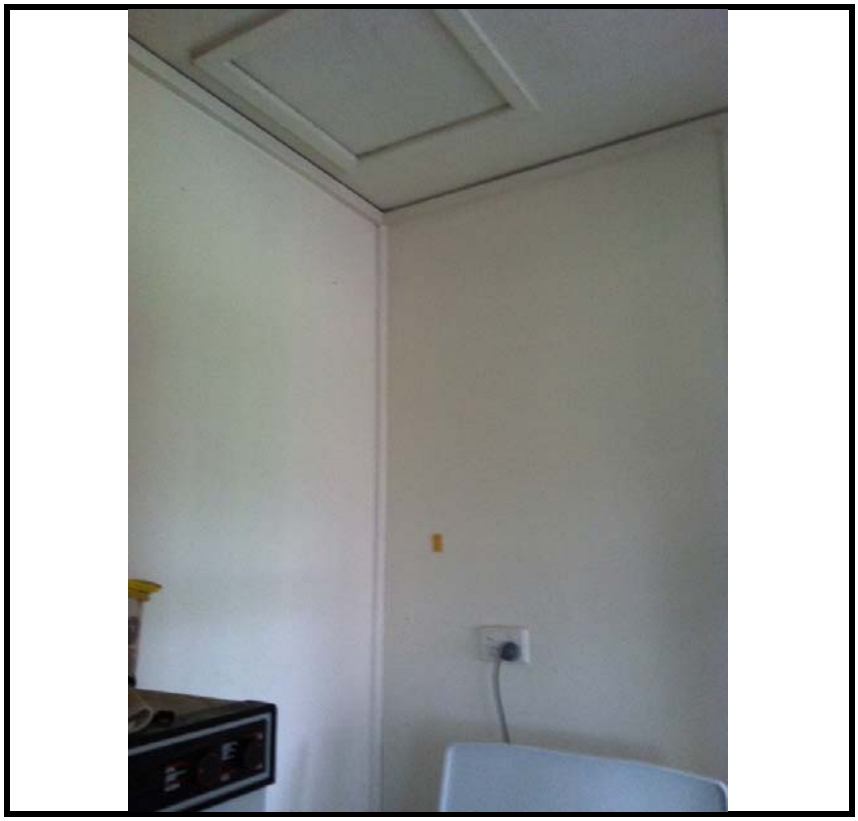

Photo 48: 16 Bowditch Avenue – ACM sheeting lining the walls and ceiling of the laundry in the house

Photo 49: 16 Bowditch Avenue – ACM sheeting lining wall and ceiling of enclosed back verandah of the house.

Photo 50: 16 Bowditch Avenue – ACM flat sheeting lining wall (panel above weatherboards) and ceiling of enclosed back verandah of the house. Also showing corrugated ACM sheeting of "weatherboard" appearance.

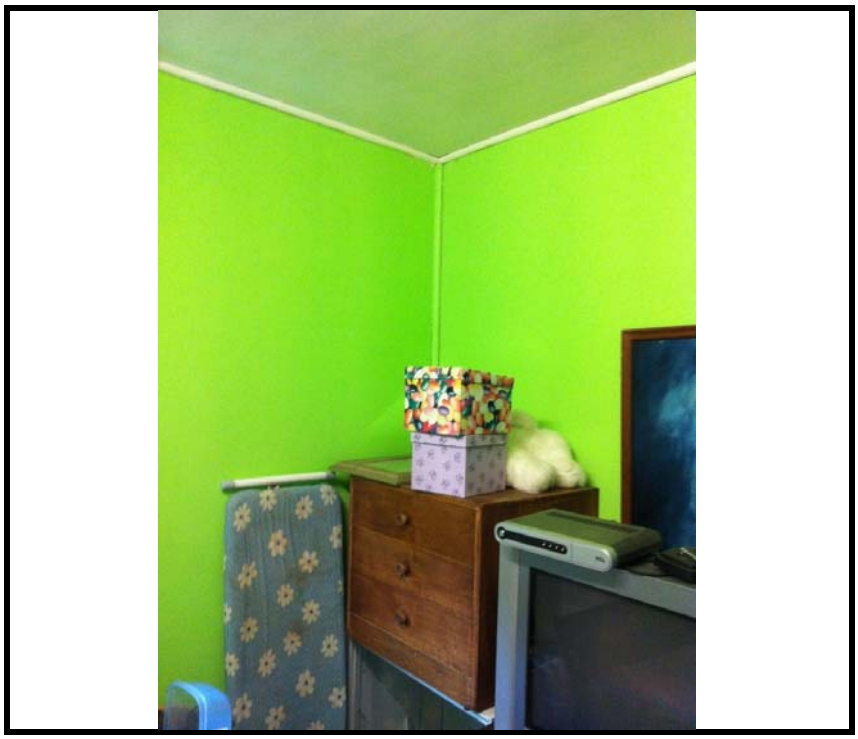

Photo 51: 16 Bowditch Avenue – ACM sheeting lining wall and ceiling of small room adjacent to enclosed back verandah

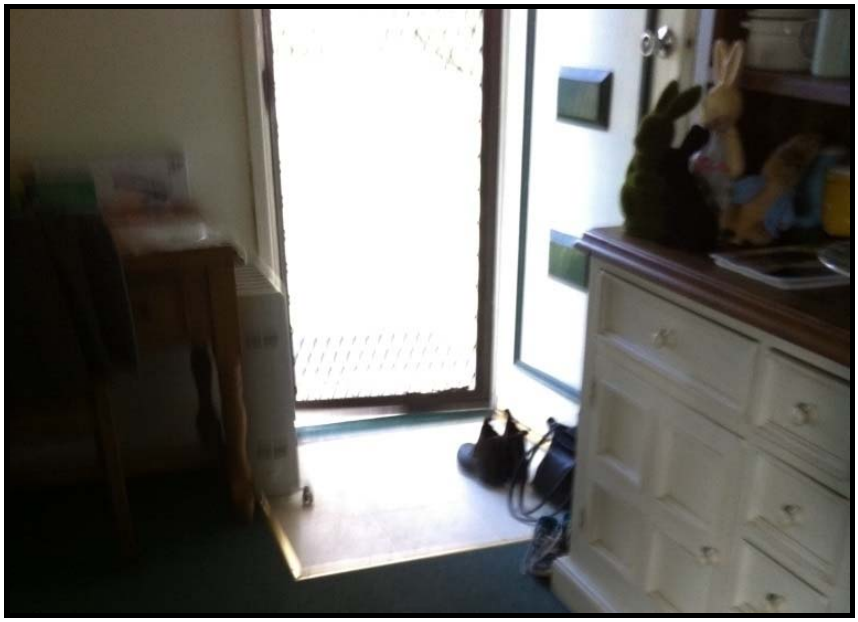

Photo 52: 16 Bowditch Avenue – Vinyl floor tiles that are potentially ACM (undamaged and due to location in inhabited house no sample taken) at the front door of the house

Photo 53: 16 Bowditch Avenue – Section of the ACM sheeting used to eaves to all sides of the house

Photo 54: 16 Bowditch Avenue – Corrugated ACM sheeting of "weatherboard" appearance to the exterior walls of the house.

Photo 55: 16 Bowditch Avenue – Corrugated ACM sheeting to the gable ends of the house.

Photo 56: 16 Bowditch Avenue – Zelemite backing board to the power box of the house

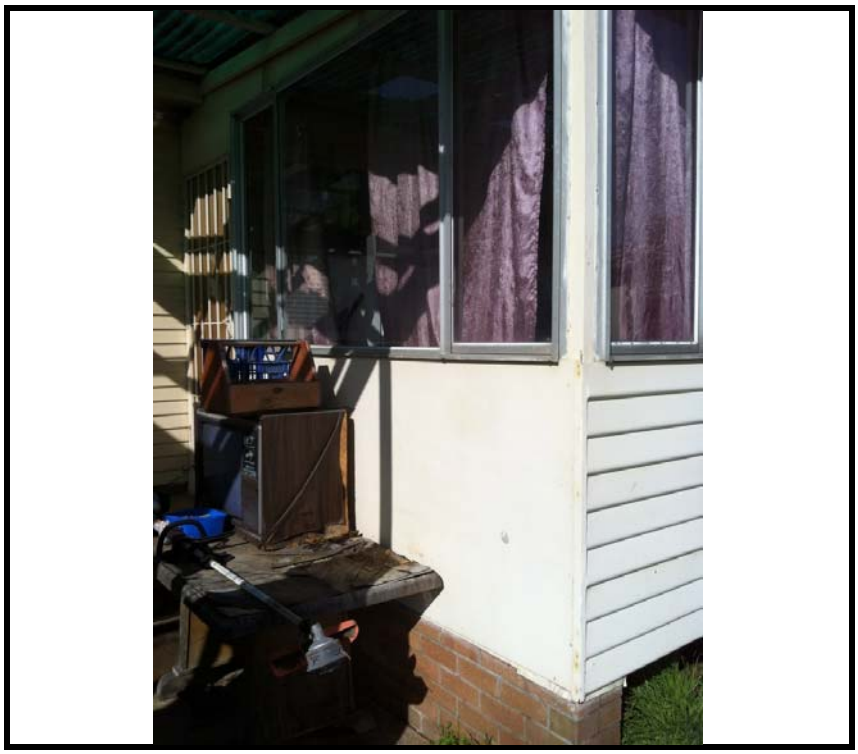

Photo 57: 16 Bowditch Avenue – Flat ACM sheeting to the back door wall of the house.

Photo 58: 16 Bowditch Avenue – ACM sheeting used to the sides and rear walls of the shed/ garage.

Appendix B

Hazardous Materials Register

Date of Audit	Parcel	Property Address	Building Name/ No.	Type of Haz Mat	Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
11/11/2013	Parcel 13	18 Bowditch Avenue	Doghouse	ACM	Sheeting	Walls to all sides	Unpainted, major damage	At ground level	30m2	N/A	EMP13-ACM-01	NAD
11/11/2013	Parcel 13	18 Bowditch Avenue	Chicken Shed (south)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, major damage, with some fragments on/in the ground near base of wall	At ground level to 2.2m above ground level	300m2	1 and 2	EMP13-ACM-02	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	Chicken Shed (north)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, some damage	At ground level to 2.2m above ground level	400m2	3 and 4	Field	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Zelemite	Backing to power board	Minimal damage, except for drilled holes	1.5m above ground level	0.5m2	5	Field	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting (boards)	Panelling to exterior walls to house, all sides	Painted, limited damage	From ground level to approx max 3.5m above ground level	150m2	6	EMP13-ACM-03	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, no apparent damage	Approx. max 3.5m above ground level	15m2	7	Assumned	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to toilet, laundry and shower	Painted, no damage, edges covered; shower section patterned surface	From ground level to approx 3m from floor	50m2	8	Assumed	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom	Painted, no damage, edges covered	From ground level to approx 3m from floor, tiled to 1.6m from floor	20m2	9	Assumed	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	On ground under the house (northeastern section)	Fragments of various sizes	On ground, in floor space approx 0.6m above ground	3m2	10	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light to front room	Appears to be of appropriate age	3m above ground level	1	11	Potential	PCB
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to front bedroom (western room)	Painted, edge strips	3m above ground level	80m2	12	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to adjacent bedroom	Painted, no strips to edges, hole (appeared recent) in one wall	Floor - 3m above ground level	80m2	13	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eastern front room walls and ceiling (apart above the fireplace)	Painted, no strips to edges	Floor - 3m above ground level	100m2	14	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in eastern front room	Appears to be of appropriate age	3m above ground level	1	14	Potential	PCB
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to living room	Painted, no strips to edges, holes in a few locations	Floor - 3m above ground level	100m2	15 and 16	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in living room	Appears to be of appropriate age	3m above ground level	1	16	Assumed	PCB
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom (except wall adjacent to toilet)	Painted, no strips to edges. Also includes patterned sheet to shower recess, with one wall tiled	Floor - 3m above ground level	40m2	17	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to kitchern and back room	Painted and wallpaper, edges with strips, paint peeling in areas	Floor - 3m above ground level	120m2	18 and 19	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Exterior walls to all side of house	Painted, some damage	0.5m - 4m above ground level	300m2	20	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides of house (including above back room)	Painted, no damage	4m above ground level	30m2	21	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting (corrugated)	Adjacent to brick step to side door, infill panel between house and ground	Under house, unpainted	At ground level	3m2	22	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Garage	ACM	Sheeting	Side walls and gable end to garage	Poor, unpainted, damaged	From ground to 3m above ground level	30m2	23	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Shed	ACM	Sheeting	Exterior walls (including corner moulding) to all sides of the shed	Poor, unpainted, damaged	From ground to 3m above ground level	50m2	24	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Shed	ACM	Sheeting	Ceiling to front (south) room of shed	Painted, minor damage	2.4m above ground level	15m2	25	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Shed	PCB	PCB	Light to front room of the shed	Appears to be of appropriate age	2.4m above ground level	1	25	Potential	PCB
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting (panels)	Exterior walls to all sides of the house	Painted, minor damage	0.5m - 4m above ground level	240m2	26	Field	ACM
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides including the awning at front of house	Painted, minor damage	4m above ground level	40m2	27	Field	ACM
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Gable ends to sides of the house	Painted, no damage	4 - 6m above ground level	60m2	28	Assumed	ACM
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Zelemite	Backing board in the older power box	Fair, drilled holes	1.6m above ground level	1	29	Field	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls to toilet room at rear of house	Painted, minor damage	Floor - 3m above ground level	10m2	30	Assumed	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, minor damage with edge strips	Floor - 3.2m above ground level	50m2	31	Field	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	House	PCB	PCB	Fluorescent lights to kitchen and adjoining room	Appears to be of appropriate age	2.4m above ground level	2	32	Assumed	PCB
10/06/2016	Parcel 13	12 Bowditch Avenue	Garage	ACM	Sheeting	Exterior walls to garage (including corner moulding)	Painted but damaged	From ground to 3m above ground level	100m2	33	Field	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	Ground near driveway entry	ACM	Sheeting	Fragments at front driveway gate	Fragments of varying sizes	On ground	1	34	Field	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Back wall of the garage	Unpainted, generally good condition, plastic edge strips, minor damge, hole	Floor - 3m above ground level	30m2	35	Field	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to laundry (including area in front of bathroom)	Painted, edge strips, undamaged	Floor - 3m above ground level	20m2	36 and 37	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to downstairs bathroom	Painted or tiled, undamaged	Floor - 3m above ground level	15m2	38	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	False ceiling to kitchen	Square sheets within a frame	3m above ground level	20m2	39	Field (refer to panels in shed)	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	PCB	PCB	Fluorescent lighst to 1st floor living room	Appears to be of appropriate age	3m above ground level	2	40	Potential	PCB
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to upstairs bathroom	Undamaged, tiled to 1.7m from the floor, then painted	Floor - 3m above ground level	10m2	41	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to upstairs ensuite	Undamaged, tiled to 1.7m from the floor, then painted	Floor - 3m above ground level	10m2	42	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting (panels)	Exterior side walls and eaves to 1st floor dormer windows to front and rear of the house	Painted, no damage	5 above ground level	10m2	43	Assumed	ACM

Date of Audit	Parcel	Property Address	Building Name/ No.	Type of Haz Mat	Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Underside to ground floor front awning	Painted with some minor damage	3m above ground level	25m2	44	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	Shed	ACM	Sheeting	3 squares on ground in outer section of back shed, appear the same as those used in kitchen	Poor, damaged	On ground	15m2	45	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the toilet	Blue patterned, with edges covered	Floor - 1.8m above ground level	10m2	46	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the bathroom	Painted, minor damage	Floor - 2.4m above ground level	20m2	47	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, undamaged	Floor - 3m above ground level	20m2	48	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to enclosed back verandah (including panel above "weatherboard" sheeting)	Painted, undamaged, edge strips	Floor - 3m above ground level	50m2	49 and 50	LP13-ACM-20	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eastern wall to enclosed back verandah	"Weatherboard" looking corrugated sheeting, painted with minor damage	0.5m - 3.5m above ground level	150m2	50	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to small room adjacent to enclosed back verandah	Painted, undamaged, edge strips	Floor - 3m above ground level	25m2	51	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	VFT	At front door	Minimal damage	On floor	1m2	52	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, undamaged	3m above ground level	30m2	53	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Exterior walls to all sides	"Weatherboard" looking corrugated sheeting, painted with some damage	0.5m - 3.5m above ground level	150m2	54	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Gable ends to the sides	Corrugated, painted, undamaged	0.5m - 3.5m above ground level	70m2	55	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Zelemite	Backing board to the power box	Fair, drilled holes	1.5m above ground level	1m2	56	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Side wall (around back door) to extension	Minor damage	0.5m - 2.5m above ground level	5m2	57	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	Shed/ Garage	ACM	Sheeting	Side and rear walls	Painted, some damage	Ground - 2.5m above ground level	100m2	58	Field	ACM

Glossary of Terms and Abbreviations Used in Registers

The following provides an explanation of terms and abbreviations used in the registers.

Location	The location within the building (e.g bathroom) and the use of the material (e.g. floor covering, soffit lining, pipe lagging)
ACM	Asbestos containing material
Bonded	Refers to ACM with its fibres firmly bound within the host media.
AC sheeting	Asbestos cement sheeting
Condition	Refers to the physical state or condition of the material in accordance with the following: • Good – material shows no, or very minor damage and/or deterioration • Fair – material shows signs of minor damage and/or deterioration • Poor – material shows sign of significant damaged and/or deterioration or the material is partly or wholly unserviceable for its intended use.
Description	Description of the material identified e.g. vinyl tile, fibre cement sheeting etc.
Friable	ACM that may be crumbled pulverised or reduced to powder by hand pressure.
LBP	Lead based paint:
Result	Refers to result of ACM or LBP analysis. • For asbestos, this is the type identified during laboratory analysis. The three main commercial asbestos types found in Australia area: chrysotile (CH-white), amosite (A-brown or grey), and crocidolite (C-blue). • NAD means no asbestos was detected during laboratory analysis. • Materials shown as 'Refer to.....' have not been sampled but visually appear the same as other material previously sampled. • 'Assumed' refers to those materials not sampled (e.g. for safety reasons or restricted access) and which are not similar to previously sampled materials; or refers to paint that is assumed to be LBP due to building age and paint condition. • 'Field' means ACM where asbestos fibres identified in field but the type of asbestos not confirmed. • 'Potential' refers to fluorescent lights where it is assumed that PCBs are present due to their apparent age.
PCB	Polychlorinated Biphenyls
Risk	Refers to the level of risk posed by the material based on its condition. friability, accessibility and other factors such as exposure to disturbance. The levels of risk adopted for the survey are Urgent (U), High (H), Medium (M) and low (L) as defined in Appendix C of this report.
SMF	Synthetic mineral fibre
Type of Material	The type of hazardous material (ACM, SMF, PCB or LBP).

Appendix C

Laboratory Certificates

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: ENVIRON Australia Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Newcastle		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes No N/A
PROJECT: Hydro Alumium Buffer Zone **PROJECT NO.: AS130348**	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN: Australia**	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Fiona Robinson **CONTACT PH: 02 4962 5444**		OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Shaun Taylor **SAMPLER MOBILE: 0408 386 663**	**RELINQUISHED BY:**	**RECEIVED BY:**	**RELINQUISHED BY:** / **RECEIVED BY:**
COC Emailed to ALS? (YES / NO) **EDD FORMAT (or default):**			
Email Reports to (will default to PM if no other addresses are listed): staylor@environcorp.com	DATE/TIME: 13/3 10:00,	DATE/TIME: 13.3.14 10:05	DATE/TIME: / DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): klewis@environcorp.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Asbestos								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	EMP13-ACM-01	4/03/2014 0:00	S	B	1	X								
2	EMP13-ACM-02	4/03/2014 0:00	S	B	1	X								
3	EMP13-ACM-03	4/03/2014 0:00	S	B	1	X								
				TOTAL										

Environmental Division
Newcastle
Work Order
EN1400844

Telephone : +61 2 4014 2500

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1400844**	Page	: 1 of 3
Client	: **ENVIRON**	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO Box 435 THE JUNCTION NSW 2291	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 4962 5444	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-4968 0349
Project	: AS130348 HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 13-MAR-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 20-MAR-2014
Site	: ----		
		No. of samples received	: 3
Quote number	: SY/433/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos

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

- **EA200 Legend**
- **EA200 'Am' Amosite (brown asbestos)**
- **EA200 'Ch' Chrysotile (white asbestos)**
- **EA200 'Cr' Crocidolite (blue asbestos)**
- **EA200 'Trace' - Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres**
- **EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.**
- **EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.**
- **EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.**

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Client sample ID	EMP13-ACM-01	EMP13-ACM-02	EMP13-ACM-03	----	----
			Client sampling date / time	04-MAR-2014 00:00	04-MAR-2014 00:00	04-MAR-2014 00:00	----	----
Compound	CAS Number	LOR	Unit	EN1400844-001	EN1400844-002	EN1400844-003	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	**No**	**Yes**	**Yes**	----	----
Asbestos Type	1332-21-4	-	--	**-**	**Ch + Am**	**Ch**	----	----
Sample weight (dry)	----	0.01	g	**10.8**	**21.8**	**16.7**	----	----
APPROVED IDENTIFIER:	----	-	--	**C.OWLER**	**C.OWLER**	**C.OWLER**	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOLID**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	EMP13-ACM-01 - 04-MAR-2014 00:00	Four pieces of organic fibre board approximately 50 x 40 x 4mm
EA200: Description	EMP13-ACM-02 - 04-MAR-2014 00:00	Four pieces of heavily degraded and friable asbestos cement sheeting approximately 50 x 50 x 4mm
EA200: Description	EMP13-ACM-03 - 04-MAR-2014 00:00	Two pieces of bonded asbestos cement sheeting approximately 90 x 25 x 5mm

QUALITY CONTROL REPORT

Work Order	: **EN1400844**	Page	: 1 of 4
Client	: **ENVIRON**	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO Box 435 THE JUNCTION NSW 2291	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 4962 5444	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-4968 0349
Project	: AS130348 HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 13-MAR-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 20-MAR-2014
Order number	: ----		
		No. of samples received	: 3
Quote number	: SY/433/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos

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.

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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

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

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

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**

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.

- **No Matrix Spike (MS) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EN1400844**	Page	: 1 of 5
Client	: ENVIRON	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO Box 435 THE JUNCTION NSW 2291	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 4962 5444	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-4968 0349
Project	: AS130348 HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 13-MAR-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 20-MAR-2014
Order number	: ----		
		No. of samples received	: 3
Quote number	: SY/433/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples							
Snap Lock Bag (EA200)							
EMP13-ACM-01, EMP13-ACM-02, EMP13-ACM-03	**04-MAR-2014**	**---**	31-AUG-2014	----	**20-MAR-2014**	16-SEP-2014	✓

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(where) 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:

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

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

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

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

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

☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: ENVIRON Australia Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Newcastle		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes No N/A
PROJECT: Hydro Alumium Buffer Zone **PROJECT NO.:** AS130348	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN:** Australia	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Fiona Robinson **CONTACT PH:** 02 4962 5444		OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Shaun Taylor **SAMPLER MOBILE:** 0408 386 663	**RELINQUISHED BY:** Kstreenfield	**RECEIVED BY:** VS	**RELINQUISHED BY:**
COC Emailed to ALS? (YES / NO) **EDD FORMAT (or default):**	DATE/TIME: 18/6/14 5pm	DATE/TIME: 18/6/14 1700	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): staylor@environcorp.com			**RECEIVED BY:**
Email Invoice to (will default to PM if no other addresses are listed): klewis@environcorp.com			DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Asbestos								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	LP13-ACM-20		S	B	1	X								
				TOTAL										

2516

Environmental Division Newcastle Work Order **EN1402089**

Telephone : +61 2 4014 2500

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 HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1402089**	Page	: 1 of 3
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com.au	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 49344354	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 49344359	Facsimile	: +61-2-4968 0349
Project	: AS130348 - HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 18-JUN-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 25-JUN-2014
Site	: ----		
		No. of samples received	: 1
Quote number	: SY/578/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos

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

- **EA200 Legend**
- **EA200 'Am' Amosite (brown asbestos)**
- **EA200 'Ch' Chrysotile (white asbestos)**
- **EA200 'Cr' Crocidolite (blue asbestos)**
- **EA200 'Trace' - Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres**
- **EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.**
- **EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.**
- **EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.**

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Client sample ID	LP13-ACM-20	----	----	----	----
				Client sampling date / time	18-JUN-2014 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EN1402089-001	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos Detected	1332-21-4	0.1	g/kg		**Yes**	----	----	----	----
Asbestos Type	1332-21-4	-	--		**Ch**	----	----	----	----
Sample weight (dry)	----	0.01	g		**0.09**	----	----	----	----
APPROVED IDENTIFIER:	----	-	--		**C.OWLER**	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOLID**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	LP13-ACM-20 - 18-JUN-2014 15:00	Three small fragments of asbestos fibre board approximately 2 x 2 x 1mm

Environmental

QUALITY CONTROL REPORT

Work Order	: **EN1402089**	Page	: 1 of 4
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com.au	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 49344354	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 49344359	Facsimile	: +61-2-4968 0349
Project	: AS130348 - HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 18-JUN-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 25-JUN-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/578/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos

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.

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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

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.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**

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.

- **No Matrix Spike (MS) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

Environmental

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EN1402089**	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com.au	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 49344354	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 49344359	Facsimile	: +61-2-4968 0349
Project	: AS130348 - HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 18-JUN-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 25-JUN-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/578/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples							
Snap Lock Bag (EA200)							
LP13-ACM-20	**18-JUN-2014**	**---**	15-DEC-2014	----	**25-JUN-2014**	22-DEC-2014	✓

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(where) 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:

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

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

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Date of Audit	Parcel	Property Address	Building Name/ No.	Type of Haz Mat	Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
11/11/2013	Parcel 13	18 Bowditch Avenue	Doghouse	ACM	Sheeting	Walls to all sides	Unpainted, major damage	At ground level	30m2	N/A	EMP13-ACM-01	NAD
11/11/2013	Parcel 13	18 Bowditch Avenue	Chicken Shed (south)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, major damage, with some fragments on/in the ground near base of wall	At ground level to 2.2m above ground level	300m2	1 and 2	EMP13-ACM-02	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	Chicken Shed (north)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, some damage	At ground level to 2.2m above ground level	400m2	3 and 4	Field	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Zelemite	Backing to power board	Minimal damage, except for drilled holes	1.5m above ground level	0.5m2	5	Field	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting (boards)	Panelling to exterior walls to house, all sides	Painted, limited damage	From ground level to approx max 3.5m above ground level	150m2	6	EMP13-ACM-03	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, no apparent damage	Approx. max 3.5m above ground level	15m2	7	Assumned	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to toilet, laundry and shower	Painted, no damage, edges covered; shower section patterned surface	From ground level to approx 3m from floor	50m2	8	Assumed	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom	Painted, no damage, edges covered	From ground level to approx 3m from floor, tiled to 1.6m from floor	20m2	9	Assumed	ACM
11/11/2013	Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	On ground under the house (northeastern section)	Fragments of various sizes	On ground, in floor space approx 0.6m above ground	3m2	10	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light to front room	Appears to be of appropriate age	3m above ground level	1	11	Potential	PCB
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to front bedroom (western room)	Painted, edge strips	3m above ground level	80m2	12	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to adjacent bedroom	Painted, no strips to edges, hole (appeared recent) in one wall	Floor - 3m above ground level	80m2	13	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eastern front room walls and ceiling (apart above the fireplace)	Painted, no strips to edges	Floor - 3m above ground level	100m2	14	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in eastern front room	Appears to be of appropriate age	3m above ground level	1	14	Potential	PCB
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to living room	Painted, no strips to edges, holes in a few locations	Floor - 3m above ground level	100m2	15 and 16	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in living room	Appears to be of appropriate age	3m above ground level	1	16	Assumed	PCB
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom (except wall adjacent to toilet)	Painted, no strips to edges. Also includes patterned sheet to shower recess, with one wall tiled	Floor - 3m above ground level	40m2	17	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to kitchern and back room	Painted and wallpaper, edges with strips, paint peeling in areas	Floor - 3m above ground level	120m2	18 and 19	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Exterior walls to all side of house	Painted, some damage	0.5m - 4m above ground level	300m2	20	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides of house (including above back room)	Painted, no damage	4m above ground level	30m2	21	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting (corrugated)	Adjacent to brick step to side door, infill panel between house and ground	Under house, unpainted	At ground level	3m2	22	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Garage	ACM	Sheeting	Side walls and gable end to garage	Poor, unpainted, damaged	From ground to 3m above ground level	30m2	23	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Shed	ACM	Sheeting	Exterior walls (including corner moulding) to all sides of the shed	Poor, unpainted, damaged	From ground to 3m above ground level	50m2	24	Field	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Shed	ACM	Sheeting	Ceiling to front (south) room of shed	Painted, minor damage	2.4m above ground level	15m2	25	Assumed	ACM
16/06/2014	Parcel 13	8 Bowditch Avenue	Shed	PCB	PCB	Light to front room of the shed	Appears to be of appropriate age	2.4m above ground level	1	25	Potential	PCB
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting (panels)	Exterior walls to all sides of the house	Painted, minor damage	0.5m - 4m above ground level	240m2	26	Field	ACM
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides including the awning at front of house	Painted, minor damage	4m above ground level	40m2	27	Field	ACM
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Gable ends to sides of the house	Painted, no damage	4 - 6m above ground level	60m2	28	Assumed	ACM
10/06/2016	Parcel 13	12 Bowditch Avenue	House	ACM	Zelemite	Backing board in the older power box	Fair, drilled holes	1.6m above ground level	1	29	Field	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls to toilet room at rear of house	Painted, minor damage	Floor - 3m above ground level	10m2	30	Assumed	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, minor damage with edge strips	Floor - 3.2m above ground level	50m2	31	Field	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	House	PCB	PCB	Fluorescent lights to kitchen and adjoining room	Appears to be of appropriate age	2.4m above ground level	2	32	Assumed	PCB
10/06/2016	Parcel 13	12 Bowditch Avenue	Garage	ACM	Sheeting	Exterior walls to garage (including corner moulding)	Painted but damaged	From ground to 3m above ground level	100m2	33	Field	ACM
16/06/2014	Parcel 13	12 Bowditch Avenue	Ground near driveway entry	ACM	Sheeting	Fragments at front driveway gate	Fragments of varying sizes	On ground	1	34	Field	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Back wall of the garage	Unpainted, generally good condition, plastic edge strips, minor damge, hole	Floor - 3m above ground level	30m2	35	Field	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to laundry (including area in front of bathroom)	Painted, edge strips, undamaged	Floor - 3m above ground level	20m2	36 and 37	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to downstairs bathroom	Painted or tiled, undamaged	Floor - 3m above ground level	15m2	38	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	False ceiling to kitchen	Square sheets within a frame	3m above ground level	20m2	39	Field (refer to panels in shed)	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	PCB	PCB	Fluorescent lighst to 1st floor living room	Appears to be of appropriate age	3m above ground level	2	40	Potential	PCB
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to upstairs bathroom	Undamaged, tiled to 1.7m from the floor, then painted	Floor - 3m above ground level	10m2	41	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to upstairs ensuite	Undamaged, tiled to 1.7m from the floor, then painted	Floor - 3m above ground level	10m2	42	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting (panels)	Exterior side walls and eaves to 1st floor dormer windows to front and rear of the house	Painted, no damage	5 above ground level	10m2	43	Assumed	ACM

Date of Audit	Parcel	Property Address	Building Name/ No.	Type of Haz Mat	Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Underside to ground floor front awning	Painted with some minor damage	3m above ground level	25m2	44	Assumed	ACM
10/06/2016	Parcel 13	14 Bowditch Avenue	Shed	ACM	Sheeting	3 squares on ground in outer section of back shed, appear the same as those used in kitchen	Poor, damaged	On ground	15m2	45	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the toilet	Blue patterned, with edges covered	Floor - 1.8m above ground level	10m2	46	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the bathroom	Painted, minor damage	Floor - 2.4m above ground level	20m2	47	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, undamaged	Floor - 3m above ground level	20m2	48	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to enclosed back verandah (including panel above "weatherboard" sheeting)	Painted, undamaged, edge strips	Floor - 3m above ground level	50m2	49 and 50	LP13-ACM-20	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eastern wall to enclosed back verandah	"Weatherboard" looking corrugated sheeting, painted with minor damage	0.5m - 3.5m above ground level	150m2	50	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to small room adjacent to enclosed back verandah	Painted, undamaged, edge strips	Floor - 3m above ground level	25m2	51	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	VFT	At front door	Minimal damage	On floor	1m2	52	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, undamaged	3m above ground level	30m2	53	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Exterior walls to all sides	"Weatherboard" looking corrugated sheeting, painted with some damage	0.5m - 3.5m above ground level	150m2	54	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Gable ends to the sides	Corrugated, painted, undamaged	0.5m - 3.5m above ground level	70m2	55	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Zelemite	Backing board to the power box	Fair, drilled holes	1.5m above ground level	1m2	56	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Side wall (around back door) to extension	Minor damage	0.5m - 2.5m above ground level	5m2	57	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	Shed/ Garage	ACM	Sheeting	Side and rear walls	Painted, some damage	Ground - 2.5m above ground level	100m2	58	Field	ACM