



Kiama Municipal Council

# Stage 2 Preliminary Contamination Assessment 104 Shoalhaven St, Kiama, NSW

Report E2W-0247 (DR001-V1)

30 July 2016



Prepared by: Dino Parisotto (Director)  
BAppSc-Geology (Hons); MAppSc-Groundwater  
Phone: (02) 4234 0829 Fax: (02) 4236 1824  
175 Fern St Gerringong NSW Australia 2534

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**earth<sup>2</sup>water**  
Pty Ltd  
Environmental & Groundwater Consulting

Client: Kiama Municipal Council

Project: Stage 2 Preliminary Contamination Assessment

104 Shoalhaven Street, Kiama, NSW, 2533

Prepared For: Mr Paul Czulowski  
Manning Street  
Kiama, NSW, 2533.

Preliminary Report: 30 July 2016

Ref: E2W-0247 DR002 (V1)

Soil Sampling @ 30 June 2016: Completed by D.Parisotto  
Laboratory Analyses: Completed by ALS Environmental Pty Ltd

Authorised: Earth2Water Pty Ltd  
Dino Parisotto – Managing Director  
(BAppSc; Geology (Hons). MAppSc; Groundwater Management)

PH (02) 4234 0829 Fax 02 4236 1824  
Office: 175 Fern Street, Gerringong, NSW, 2534.

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## EXECUTIVE SUMMARY

Earth2Water Pty Ltd (E2W) was engaged by Council to undertake a Stage 2 Preliminary Contamination Assessment (Stage 2) at the residential site located at 104 Sholahaven Street, Kiama, NSW (Figure 1). E2W understand the house is owned by Council and is planned for future development (or demolishing) as residential or potentially commercial (e.g. Lyon's Club House).

Stage 2 included excavation and sampling of 10 testpits (TP1-10), two soil hand auger bores (BH-1A, BH-2A), and collection of two targeted composite samples (Shed C-1, House C-1) around perimeter of buildings. The purpose of Stage 2 is to address Council requirements to identify risks, and development constraints associated with potentially contaminated land immediately adjacent to the neighbouring (contaminated) gas works site.

Based on the Stage 2 undertaken on 30 June 2016, the site conditions are as follows;

- The Site is mapped as being underlain by volcanic bedrock (Blow Hole Latite Member). Fill material was identified across at the site (0 ~0.5m depth) and comprised clay loam, coke ash/slag, blue metal, and some domestic construction materials (bricks, concrete).
- Two aged buildings (house and shed) are in poor condition and clad with fibro sheeting. A transpiration bed (80m<sup>2</sup>) and demolished two septic tanks are situated in the rear yard.
- No asbestos was detected in the 16 soil samples tested at the site.
- Analytical laboratory testing (TPH/BTEX, PAH, PCB, OCP, heavy metals, cyanide concentrations) indicates that the majority of soil results are reported below the NEPM (2013) health based guidelines for low density residential land use (i.e. HIL/HSL-A). Exception include, lead at one location (TP-6A= 403 mg/kg), which exceeds the NEPM (2013) HSL/HIL-A of 300 mg/kg.
- All soil analytical results are below the NEPM (2013) health based guidelines for commercial land use (NEPM 2013, HIL/HSL-D).
- The results of the composite samples are considered indicative only of the soil contamination status (each composite is formed by mixing four sub samples around perimeter of building). Composite samples (ShedC-1, HouseC-1) exceeded the NEPM (2013) HSL/HIL-A for lead (288 mg/kg, 370 mg/kg) based on the direct/adjusted guidelines (divided by 4). The composite (ShedC-1) exceeded NEPM (2013) HSL/HIL-A for cadmium (6 mg/kg), and zinc (6590 mg/kg) based on adjusted guidelines (divided by 4). The concentrations of TPH (C16-C34=370 & 230 mg/kg) in composite samples (i.e. ShedC-1, House C-1, & mix of 4 sub-samples each) exceeded the NEPM (2013) ESLs (300 mg/kg).
- Marginal exceedances of NEPM (2013) ecological screening levels (ESLs- low reliability guidelines for various land uses) are reported from four testing locations (BH-2A, TP-2A, TP-5A, TP-10A). The NEPM (2013) ESL exceedances for PAH/BaP are related to a coarse soil type only, and not fine grained soils (Note: clay loams and gravel present at the site). The marginal exceedances NEPM (2013, ESLs) for BaP are at locations within the front and rear yard (BH-2A, TP-2A, TP-5A, TP-10A).
- Due to the neighbouring gasworks site, age of the buildings (e.g. 1960-1970s), and visible coke ash in the back yard (surface near TP-1 & TP-2), E2W consider that potential risks to future sensitive residential land exists due to localised, patchy or buried gasworks waste within building footprints, fill and retaining walls.

### ***Recommendations for Sensitive Land Use (residential)***

- Excavation and offsite disposal of transpiration bed and materials comprising coke-ash, coal, slag from onsite soils to address actual/potential contamination risks associated with micro-biological hazards and gasworks related waste.
- Excavation, removal and appropriate disposal of septic tank structures.
- Excavation, removal of derelict pipework (PVC at transpiration bed, old galvanised water pipes).
- Excavation, removal and disposal of degraded soil fill (PAH/TPH/metals impact, demolition waste- concrete/bricks/metal). Covering, capping of the site (front/year yards) with clean top soil (~0.1m thick) to minimise potential exposure of contamination (gas works related waste).
- Further testing is recommended around the two buildings and location of composite samples to assessment the soil contamination status (i.e. 8 sample locations), and remedial requirements (as required).
- Stage 3 investigation is recommended if buildings are demolished. The soil testing would target the building foot print (data gap) and asbestos impact following removal of onsite structures. Validation sampling and or inspection is required for any remedial works (removal of transpiration beds, or impacted soil).

### ***Recommendations for Commercial Land Use (e.g. Lyons Club House)***

- Excavation, removal, offsite disposal of transpiration bed (80 m<sup>2</sup>) and surface materials comprising coke-ash, coal, slag from onsite soils to address risks associated with micro-biological hazards and gasworks related waste.
- Excavation, removal and appropriate disposal of septic tank structures (concrete, bricks, and bio-sludge, i.e. micro-biological hazards).
- Soil capping or top soil cover for the site (front/rear yard) is recommended for commercial land use to mitigate any unexpected findings. Imported agricultural soil is recommended for the establishment of gardens.

A stage 3 investigation is recommended if buildings are demolished. The soil testing would target the building foot print (data gap) and also the potential for residual asbestos following removal of onsite structures. Further testing is recommended at the composite sample locations to assess the soil contamination status (i.e. 8 sample locations). Validation sampling and or inspection is required for any remedial works (removal of transpiration beds, or impacted soil).

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## 1. INTRODUCTION

Earth2Water Pty Ltd (E2W) was engaged by Kiama Municipal Council (KMC) to undertake a Stage 2 Preliminary Contamination Assessment (Stage 2) at a vacant residential property located at 104 Sholahaven Street, Kiama, NSW (Site, Figures 1&2). E2W understand the house is owned by Council and is planned for future development (or demolishing) as residential or potentially commercial (e.g. Lyon's Club House).

The Stage 2 work included excavation and sampling of 10 testpits (TP1-10), two soil hand auger bores (BH-1A, BH-2A), and two targeted composite samples (Shed C-1, House C-1) around the buildings. Extensive contamination testing was undertaken by E2W (2007) in the neighbouring former gas works site to assess legacy soil and groundwater impact (Figures 1 and 2). The purpose of E2W's Stage 2 work is to address Council requirements to identify risks and development constraints associated with potentially contaminated land (e.g. legacy impacts associated with the neighbouring gas works site).

This report by E2W summarises the field and analytical testing results associated with Stage 2 site contamination assessment undertaken on 30 June 2016. Recommendations are included to address impacted soils (i.e. removal of transpiration bed, excavation/removal of septic tanks (2), removal of derelict pipe-work (transpiration beds, galvanised/corroded water pipes, PAH impacted soils and remnant gasworks waste- coke ash/slag etc). A Stage 3 investigation is recommended if the site buildings (shed, house) are decommissioned, to enable the adequate characterisation of the entire site and potential residual impacts following demolishing of buildings (e.g. asbestos).

## 2. OBJECTIVES AND BACKGROUND

Objectives of the stage 2 Preliminary Contamination Assessment are as follows:

- Assess the contamination status of the site.
- Assess risks associated with potential/actual contamination and address via environmental control measures or remediation (as required).

The former Kiama Gasworks is a known contaminated site (Appendix D). Coffey (2004) and E2W (2007) indicated that the gasworks site constitute a significant risk of harm due to the elevated contamination (TPH/BTEX/PAHs). The contamination identified at the former Kiama gasworks has not been remediated.

Coffey Geosciences Pty Ltd (Coffey) has completed a preliminary and subsequent Stage 2 environmental assessment of the former gasworks site. The works were undertaken in May 2003 and February 2004. E2W conducted extensive investigations at the former gasworks site, Cukuna Timber Yard, and the downgradient offsite area. The extent of soil and groundwater contamination associated with the former Kiama gasworks is presented in Appendix D (Figures 1 to 5 summarise the legacy of TPH/BTEX/PAH impact).

The residential property although adjacent to the former gasworks indicates a minor potential for impact (soil/water) due to its higher elevation (>2m) relative to the gasworks site (Plates 1 to 9,

Appendix D). Groundwater and seepage is downhill of the residential site and towards the gasworks site and former creek line. A rock wall (1-3m high) and dish drain captures any polluted seepage and flows on the southern boundary and way from the residential property.

The residential property and dwellings are in a dilapidated state (Plates 1-9). The site is currently vacant, and has generally been unused for several years.

### 3. SCOPE OF WORK

The scope of work undertaken by E2W is as follows:

- E2W inspected the site and potential test-pit locations in consultation with KMC (Paul Czulowski) on 21 April 2016 and 30 June 2016.
- Checking of services using diagrams and site inspection.
- Excavation of 10 shallow testpits (0.5 to 1.5m) using Council excavator (3 tonne, 0.5m wide bucket) guided by E2W (Dino Parisotto) on 30 June 2016. Testpits were excavated to natural ground or refusal on tree roots or bedrock.
- Testpits (10) were geologically logged and photographed. Soil samples were collected at various depths (0-0.1m, 0-0.2m, 0-0.3m, and ~0.5m-0.7m) using a stainless steel and decontaminated trowel. Soils were analysed for a selection of TPH/BTEX/PAHs/OCP, PCB, cyanide, pH, heavy metals and asbestos.
- Two soil hand auger bores (BH-1A, BH-2A) were excavated to approximately 0.3m depth to assess the contamination status in drive way and front yard.
- Two targeted composite samples (Shed C-1, House C-1) comprising four sub samples each were collected from around the two buildings. Samples were analysed for a broad range of analyses (TPH/BTEX/PAHs, heavy metals and asbestos) to provide an indication of contamination present around the perimeter of buildings.
- Additional PAH analyses (i.e. TP-2B, TP-5B, TP-10B) was undertaken following receipt of initial results to better characterise PAH impact below surface sample locations (TP-2A, TP-5A, TP-10A). Three samples (TP-6A TCLP=Pb, TP-10A TCLP= Pb, ShedC-1 TCLP=Pb & Zn) with elevated heavy metals were subjected to leachate analyses (TCLP), for waste classification and environmental assessment purposes.
- All samples were stored within insulated containers prior to being despatched under the standard E2W chain of custody procedures, to the analytical laboratory (ALS) in Sydney (NATA Accredited).
- A desk top assessment including a review of historical aerial photographs (1949, 1988, 2007), previous reports (E2W 2007), environmental maps, and obtaining a Section 149 certificate (2 &5) for the site.
- Preliminary Reporting, including data assessment and analyses of information collected from the site.

### 4. SITE INFORMATION

The residential site is approximately 462 m<sup>2</sup> in area (14m by 33m), and identified as 104 Shoalhaven Street, Kiama, NSW (Figure 1). The site is currently vacant and maintained by Council. Details of the zoning and Lot and DP are outlined in the Section 149 certificate attached in Appendix A.

The site comprises a single storey small brick/fibro clad house and a separate garden shed (fibro construction) each with corrugated iron roofs. The buildings are dilapidated and estimated as 1960s- 1970s constructions. A drive way exists (grass cover) on the southern boundary linking Shoalhaven Street and the garden shed. The front and rear garden are grass covered, with several large trees in the rear yard (south boundary, Plates 1 to 9). Services (power, water) have been disconnected from the site.

Based on discussion with council, two septic tanks were located in the rear yard and recently demolished and backfilled (early June 2016). A small brick wall exists (L-shaped) in the rear yard marking the location of the former transpiration bed (8m by 10m).

The site is surrounded by a mix of residential (west, north) and commercial/industrial properties (east, south). The site boundary is marked by fencing (timber, steel, chain wire) with entrance via Shoalhaven Street (Figure 1).

The street frontage is approximately 14m wide, and 33m deep. The shape of the site is rectangular and relatively level to sloping (to south) at the rear, and more steeply sloping (also to south) on the front yard (Figures 1 & 2). The south boundary is marked by (4 ft) chain wire fencing, a rock wall, sharp drop off (1 to 3 m), and a open narrow dish drain (flows to east) which runs parallel to west boundary. Residential properties and boundary fencing (6ft) exists on the north and west (rear) boundaries, whilst the front yard is unfenced.

The site is unlikely to contain any gasworks infrastructure. However, some evidence of gasworks by-products such as coke ash and siliceous slag were evident in the rear yard, transpiration beds and soil profile observed in the 10 test-pit excavations.

#### **4.1 Neighbouring Gasworks Site History**

The gasworks formerly occupied a larger footprint (>1,300m<sup>2</sup>) which included parts of Cukuna Timberyard (south) and the Council works depot (west). The former gasworks infrastructure, such as the original retort building still exist at the Cukuna Timber yard and used for storage of hardware materials.

The Kiama Gas Company works supplied gas to the municipality from about 1884 to mid 1960's. The gasworks produced gas from the carbonization of coal. Refer to appendix B for historical aerial photographs (1949, 1988, 2007) illustrating the extent of gasworks and isolation from the residential site.

In 1927, Kiama Municipal Council took over operations until its closure in 1960. Council records indicate that Council leased the site to several gas distribution companies from 1960 to recent times (early 2000?). In the 1960's the site was used to store and distribute LPG (Coffey, 2003).

A former creek line bisects the southern boundary of the site. The creek was covered and piped in the mid 1980's. Based on anecdotal evidence, tar occasionally overflowed from the tar well and settled into base of the old creek line. The location of the former creek line/currently piped drain is shown on Figures in Appendix D.



## 4.2 Geology/Hydrogeology

The Site is mapped as being underlain by volcanic bedrock (belonging to the Shoalhaven Group formation and the Permian aged Gerringong Volcanics- the Blow Hole Latite Member), which lies adjacent to Quaternary Alluvium (alluvium, gravel, sand) according to the Geological Series Sheet (1:50,000 9028-1, 1974). The Alluvium is interpreted to occur only on the former Gasworks site and not the residential site due to its higher elevation.

The bedrock at the site is weathered and also comprises silty-clay. Bedrock outcrop is evident along the southern boundary (rock wall) and was intersected in several test pits (<1.5m) excavated at the site. A wedge of alluvium (fine grained) is interpreted around the lower areas (offsite) around the former creek line, and adjoining gasworks and timber yard site (Figure 1).

A layer of fill (clay loam, gravel, silty clay) was encountered at the residential site. The filling and levelling of ground levels at the site (rear yard) is interpreted to occur during construction of the house and installation of the transpiration bed.

Groundwater was not encountered at the site, however localised and temporary water ingress was observed in one test-pit (TP-8, water level at 0.4mbgl) and likely to relate to the recent destruction/backfilling of a nearby septic tank.

The onsite geology produces a brown clay loam soil type with a sharp to diffuse contact with the underlying bedrock (0.5 to >1m depth).

## 5. QUALITY ASSURANCE /QUALITY CONTROL

As part of the soil and water sampling program, E2W implemented a field and laboratory quality control (QA/QC) program. The data quality objectives (as per NEPM 2013) are outlined in Appendix E. The following QA/QC measures were implemented for the offsite investigation (soil/groundwater sampling) at the Site:

- All work was undertaken by an experienced environmental scientist from Earth2Water Pty Ltd (Dino Parisotto) according to in-house site investigation procedures developed from NSW EPA and NEPM (2013) sampling protocols.
- All samples were collected by using decontaminated sampling equipment (trowels, bowls) and transferred into laboratory supplied sample containers.
- All samples were delivered to ALS Environmental Pty Ltd using E2W's chain of custody procedures.
- All samples were analysed by a NATA accredited laboratory (ALS Environmental Pty Ltd) within the required holding times for each analyses.
- One blind duplicate sample (TP4A/Dup-01) was collected to assess the precision and reliability of the laboratory testing and heterogeneity of the soil samples.
- An assessment of RPD (relative percent difference) was calculated between the primary and blind duplicate soil samples.
- The laboratory conducted QA/QC procedures according to NEPM 2013 protocols which included; NATA approval, detection limits, sample receipts forms, calibration and standards checks, method & analysis blanks, percent recovery results for surrogates, matrix spikes, and laboratory control duplicates. The final laboratory reports are attached in Appendix C.

In summary, E2W considers that the analytical data provided by ALS is acceptable for the purpose of the offsite soil assessment.

## 6. CONTAMINATION ASSESSMENT GUIDELINES

The 14 soil sampling locations (TP1-10, BH1A-BH2A, ShedC-1, House C-1, and 1 QA sample) investigated by E2W are considered adequate for the Stage 2 preliminary contamination assessment. The sampling locations (14) were based on the site area (462 m<sup>2</sup>) and based on NSW EPA guidelines (Sampling Design Guidelines, 1995. Note: A minimum of 5 sampling points is recommended for a 500 m<sup>2</sup> parcel of land to detect an 11.8 m diameter hotspot with 95% accuracy). The sampling density (14 samples/462 m<sup>2</sup>) is considered to be sufficient, given the variability of soil at the site.

A summary of the relevant soil assessment criteria for the site are presented in Table 2, whilst laboratory reports are included in Appendix C. Exceedances are illustrated in Figure 3.

The following guidelines were utilised during the documentation, sampling design & reporting phases of this investigation:

- NSW EPA (1997), Guidelines for Consultants Reporting on Contaminated Sites
- NSW EPA (1998), Guidelines for the NSW Site Auditor Scheme
- NSW EPA (1995), Sampling Design Guidelines
- NSW DEC (2007), Guidelines for the Assessment and Management of Groundwater Contamination.

The proposed health based guidelines NEPM (2013, NEPM HSL-A & HIL-A) are founded on proposed future sensitive land uses scenarios (i.e. residential land use) given the surrounding residential development. It is noted that DECC Waste Classification Guidelines (2008) are appropriate for this assessment as soils/fill may be removed to remediate the site for sensitive land use (commercial land use requires minimal remedial works).

The analytical results have been evaluated against the following published guidelines:

### *Soil*

- National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013), which outlines:
  - Health Investigation Levels (HILs) for metals and organic substances. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. HIL ‘‘ for residential land use was applied (current).
  - Health Screening Levels (HSLs) for selected petroleum compounds and fractions. The HSLs are applicable when assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures. HSL – health screening levels, ‘A’ (low density residential), soil type – sand (this has been used instead of clay given the fill and transpiration bed/gravel materials). HSLs are also depth dependant (samples are 0<1m depth) .
  - Management Limits are referenced when policy considerations/decisions are required which reflect the nature and properties of petroleum hydrocarbons (such as formation of observable light non-aqueous phase liquids (LNAPL), fire and

explosive hazards; and effects on buried infrastructure). When the management limits are exceeded, further site-specific assessment and management may enable any identified risk to be addressed.

- o DECC (2008) Waste Classification Guidelines: Part 1: Classifying the Waste. Used to facilitate the future disposal of soils (NSW EPA approved landfill facility). Criteria for Asbestos is based on "no detectable" asbestos fibres.
- o NSW EPA (1994) Guidelines for Assessing Service Station Sites.
- o NSW EPA Protection of the Environment Operations (Waste) Regulation 2005: General Exemption Under Part 6, Clause 51 and 51A, The excavated natural material exemption 2012 (this guideline is for the beneficial offsite reuse of clean materials from the site for land applied fill). The parameters for this assessment have not been analysed for and requires formation of stockpiles after site infrastructure is removed).

The following summarises the chemicals of concern<sup>1</sup> for NEPM (2013) commercial land use guidelines (i.e. alternative to sensitive land use to minimise remedial costs);

- Commercial land use guidelines for total PAHs & BaP= 4,000 and 40 mg/kg, respectively (or 400 & 4 mg/kg for high density residential land use with minimal access to soil).
- Commercial land use guidelines for Lead = 1500 mg/kg (or 1200 mg/kg for high density residential land use).
- Commercial land use guidelines for TPH (C6-C10) and TPH (>C10-C16) = 680 & 500 mg/kg respectively (or TPHC6-C10, TPH >C10-C16 = 180 & 130 mg/kg, respectively for high density residential land use).

In summary, the commercial land use guidelines (NEPM-2013, HSL-D) and possibly high density residential (HSL/HIL-B for lead) reduces the risk and remedial requirements for the site. The remedial requirements are based on health (HSL) and ecological based (ESL<sup>2</sup>) risks to future land use scenarios. Import of agricultural soil/garden can be used to address risks (ESL) to local flora and fauna.

## 6.1 Contaminants & Areas of Concern

E2W refer to previous investigations conducted at the former Kiama Gasworks to identify the contaminants of concern and also the pollutants related to residential land use (e.g. transpiration beds, septic tanks, asbestos, imported fill).

Soil and groundwater at the offsite area surrounding the former gasworks site are contaminated with substances in such a way as to potentially present a significant risk of harm (Contaminated Land Management Act, 1997, Refer to Appendix D, and Figures 2, 3 and 5). The chemicals of concern ("the contaminants") include the following:

- Coal tar (dark heavy and odourous liquids often associated with coke ash/slag)
- PAHs (16 priority polycyclic aromatics, including BaP, and napthalene)
- TPH/BTEX (total petroleum hydrocarbons, benzene, toluene ethylbenzene, xylene) benzene which is a known carcinogen)
- Cyanide & Ammonia

<sup>1</sup> Exceeding the NEPM (2013) guidelines for; ESL and HSL/HIL-A for low density residential

<sup>2</sup> Plant/environmental ecological health risks arise from existing soil status.

Based on the site inspection conducted by E2W and Council (30 June 2016), E2W interpret that some gasworks waste such as coke ash (as surplus fill) may have been historically disposed on the residential site. Some fragments of coke ash, coal and siliceous slag were observed in the rear yard during E2W site investigation. Based on E2W previous works conducted at Kiama Gasworks the coke ash is a common indicator of associated PAH impact.

## 7. INVESTIGATION RESULTS AND DISCUSSION

The results of testing at the 10 test-pits, 2 bores and 2 composite samples are presented in Tables 1 (soil sampling register) and 2, Figures 2 and 3. Quality control information for soil analyses is provided in Table 3 and Appendix C (QCI report). The analytical results from the site assessed in the following subsections.

### 7.1 Field Observations

The observations obtained from site inspections and testing (10 test-pits, 2 bores and 2 composite samples) are presented in Tables 1, Figure 2 and following subsections.

Soils were collected and analysed at the following depth intervals (when possible):

- Shallow: 0 to 0.1m, 0 to 0.2 m, or 0 to 0.3m
- Depth: approximately 0.5 to 0.7 m

Fill material from 0m to approximately 0.5m thickness (consisting of various proportions of clay loam, gravel, some coke ash/slag, concrete, bricks) was across the site. Insitu residual soils comprising brown clay loam/silty clay was encountered at several locations (TP-4,6,10). Refer to Plates 1-9.

Bedrock (brown siltstone) was encountered in two testpits (TP3 & 4) at approximately 0.5m depth, whilst bedrock outcrop is visible on the southern boundary.

E2W field observations based on the E2W investigations are as follows:

- Evidence of gross pollution was not observed at the site (e.g. soil discolouration, stressed or dead vegetation, odours, vapours, spoil). The site comprises extensive green grass cover, with exception of the south west corner (likely access route for mowers to the neighbouring council works depot). The site is mostly fenced, except for the eastern boundary.
- Some general domestic fill (debris- broken glass, paper, cans, flaking paint) was observed around the building. Some fragments of asbestos sheeting was noted in garden beds and linked to the dilapidated structures (shed and house). Indoor areas were not inspected.
- The flat area and low brick wall (L shaped) in the rear yard appears to mark the location of a transpiration bed (8m by 10m) and presence of gravels (coke ash, blue metal @0.5m thick) and associated PVC pipework. Some old galvanised water pipes were encountered during the pit excavations, as wells as demolition/domestic fill (brick/concrete) associated with breakup/backfill of septic tanks (2).

## 7.2 Analytical Results (Soil)

The samples selected for analytical testing are presented in Tables 1 & 2. Additional samples were analysed (i.e. TP-2B, TP-5B, TP-10B for PAHS) following receipt of initial results to better characterise the depth of PAH impact at locations with elevated results. The results of the composite samples (ShedC-1, HouseC-1) are considered indicative only of the soil contamination status (each composite is formed by mixing four sub samples around perimeter of building).

Three samples (TP-6A TCLP=Pb, TP-10A TCLP= Pb, ShedC-1 TCLP=Pb & Zn) were subjected to leachate analyses for waste classification and further environmental assessment purposes.

- No asbestos was detected in the 16 samples tested at the site.
- Analytical testing indicates that the majority of results are reported below the NEPM (2013) health based guidelines for low density residential land use (HILs/HSL). An exception includes, the lead concentrations at one location (TP-6A= 403 mg/kg), which exceeds the NEPM (2013) HSL/HIL-A of 300 mg/kg. The two composite samples (ShedC-1, HouseC-1) also exceeded the NEPM (2013) HSL/HIL-A for lead (288 mg/kg, 370 mg/kg) based on adjusted guidelines (divided by 4). The composite (ShedC-1) also exceeded NEPM (2013) HSL/HIL-A for cadmium (6 mg/kg), and zinc (6590 mg/kg) based on adjusted guidelines (divided by 4). All soil analytical results are below the NEPM (2013) health based guidelines for **commercial land use** (HIL/HSL-D)
- Marginal exceedances of NEPM (2013) **ecological** screening levels (ESL's i.e. coarse soils BaP=0.7 mg/kg, but not fine soils BaP=1.4 mg/kg) are reported for BaP (PAH) at four test pit locations (BH-2A, TP-2A, TP-5A, TP-10A). The four locations are associated with both fill (coke ash) and natural soils (clay loams). Concentrations of BaP ranged from 0.9 mg/kg to 1.3 mg/kg. Leachate (TCLP) results for sample (TP-2A) are reported below detection limits (BaP= 1.3 mg/kg and TCLP=< 1 ug/L) indicating low leachability and risks to the aquatic environment<sup>3</sup>.
- The concentrations of TPH (C16-C34=370 & 230 mg/kg) in composite samples (i.e. ShedC-1, House C-1, & mix of 4 sub-samples each) exceeded the NEPM (2013) ESLs (300 mg/kg). Further assessment of TPH concentrations is required to assess elevated TPH/PAH/metal concentrations around the buildings (i.e. collection of individual samples, Figure 2).

The soil at the site is classified as general solid waste, as per the DECC (2008) Waste Classification Guidelines (*Note: further waste classification is recommended during Stage 3 to ensure that hotspots (e.g. Pb, Ni etc) around the shed/house are addressed and sufficient statistical assessment is conducted*). The waste classification takes into consideration the results of TCLP analyses for heavy metals and PAHS (Pb, BaP) to enable assessment of waste using both total and leachable concentrations as outlined in Table 1 & Table of the guidelines.

The nature and extent of TPH/PAH concentrations detected at the site indicate some likely impact from gasworks related pollution. The presence of coke ash/slag in the rear yard and through the fill (approximately 0.5m depth) indicates potential for localised hotspots. The PAH concentrations marginally exceed the conservative (low reliability) NEPM (2013) ESL guidelines indicating potential risks to ecological health (local flora and fauna).

<sup>3</sup> Ecological issues can be mitigated by importing top soil and agricultural soils (garden beds) to the site.



## 8. CONCLUSIONS AND RECOMMENDATIONS

Based on the Stage 2 preliminary contamination assessment undertaken at the site on 30 June 2016, E2W offer the following conclusions;

- The Site is mapped as being underlain by volcanic bedrock (belonging to the Shoalhaven Group formation and the Permian aged Gerringong Volcanics- the Blow Hole Latite Member. Fill material was identified across at the site (shallow soil to ~0.5m depth) and comprised clay loam, coke ash/slag, blue metal, and some domestic construction materials (bricks, concrete).
- The site comprises out dated waste water facilities which are no longer appropriate for the site (e.g. transpiration bed and two septic tanks). The two existing buildings (house and shed) are in poor condition and clad with fibro sheeting. Demolition works (buildings) should be followed by a Stage 3 assessment to assess asbestos impacts, and to check underneath the building footprints (data gaps).
- All soil analytical results are below the NEPM (2013) health based guidelines for commercial land use (NEPM 2013, HIL/HSL-D).
- No asbestos was detected in the 16 soil samples tested at the site.
- Analytical testing (TPH/BTEX, PAH, PCB, OCP, heavy metals, cyanide concentrations) indicates that the majority of results are reported below the NEPM (2013) health based guidelines for low density residential land use (HILs/HSL). Exception includes, lead concentrations at one location (TP-6A= 403 mg/kg), which exceeds the NEPM (2013) HSL/HIL-A of 300 mg/kg.
- Results of composite samples (2) are considered indicative only of the soil contamination status (each composite is formed by mixing four sub samples around perimeter of building). Discrete sampling is required for the individual samples provided for composite samples. The two composite samples (ShedC-1, HouseC-1) exceeded the NEPM (2013) HSL/HIL-A guidelines for lead (288 mg/kg, 370 mg/kg, guidelines divided by 4). The composite (ShedC-1) exceeded NEPM (2013) HSL/HIL-A for cadmium (6 mg/kg), and zinc (6590 mg/kg) based on adjusted guidelines (divided by 4). The TPH (C16-C34=370 & 230 mg/kg) concentrations in ShedC-1, House C-1 (4 sub-samples each) also exceeded the NEPM (2013) ESLs of 300 mg/kg. Further testing is required to assess the soil contamination status around the buildings (collection of individual samples).
- Several marginal exceedances of the NEPM (2013) ecological screening levels (ESLs- low reliability guidelines) are reported from four testing locations (BH-2A, TP-2A, TP-5A, TP-10A). Exceedances for PAH/BaP were for coarse soil type only, and not for fine grained soils. Marginal exceedances NEPM (2013, ESLs) for BaP are reported at locations within front and rear yard (BH-2A, TP-2A, TP-5A, TP-10A). Concentrations of BaP ranged from 0.9 mg/kg to 1.3 mg/kg, whilst TCLP for TP-2A are below detection limits (BaP= 1.3 mg/kg, TCLP=< 1 ug/L) indicating low leachability and general solid waste classification (DEC, 2008).
- The former gasworks site is located downhill and south of the site and associated with known contamination. The chemicals of concern (“contaminants”) at the former include: Coal tar (dark heavy and odorous liquids often associated with coke ash/slag), PAHs (16 priority polycyclic aromatics), TPH/BTEX (total petroleum hydrocarbons, benzene, toluene ethylbenzene, xylene) benzene which is a known carcinogen), Cyanide, and Ammonia (water). Due to the proximity of the former gasworks site to the residential site, and visible presence of coke ash in the back yard (area of TP-1 & TP-2), E2W consider that some risk to future residential land exists due to potentially localised and buried gasworks waste (e.g. buried under structures, within fill and retaining walls). The house was built during

1960/1970s with potential of fill materials coming from the active gasworks site (surplus coke ash and tar etc).

### ***Recommendations for Sensitive Land Use (residential)***

Based on the site inspection, analytical results and also aesthetic issues (relevant for sensitive and low density residential land use) the following recommendations are offered:

- Excavation, removal and offsite disposal of transpiration bed and materials comprising coke-ash, coal, slag from onsite soils to address actual/potential contamination risks associated with micro-biological hazards and gasworks related waste.
- Excavation, removal and appropriate disposal of septic tank structures.
- Excavation, removal of old/derelict pipework (PVC at transpiration bed, old water pipes etc).
- Excavation, removal and disposal of degraded fill (PAH/TPH/metals impact and or demolition waste- concrete/bricks/metal). Covering, capping of the site (front/year yards) with clean top soil (~0.1m thick) to minimise potential exposure of contamination (gas works related waste).
- A stage 3 investigation is recommended if buildings are demolished. The soil testing would target the building foot print (data gap) and also the potential for residual asbestos following removal of onsite structures. Further testing is recommended around the two buildings and location of composite samples to provide a more specific assessment of the soil contamination status (i.e. 8 sample locations), and remedial requirements (as required).

Capping of the degraded fill is not recommended for a proposed sensitive residential land use which may involve future soil disturbance and home grown produce.

### ***Recommendations for Commercial Land Use (e.g. Lyons Club House)***

Based on the site observations and analytical results the following recommendations are offered for commercial land use:

- Excavation, removal and offsite disposal of transpiration bed (80 m<sup>2</sup>) and surface materials comprising coke-ash, coal, slag from onsite soils to address risks associated with micro-biological hazards and gasworks related waste.
- Excavation, removal and appropriate disposal of septic tank structures (concrete, bricks, and bio-sludge, i.e. micro-biological hazards).
- Soil capping or top soil cover for the site (front/rear yard) is recommended for commercial land use. Imported agricultural soil is recommended for the establishment of gardens.

A stage 3 investigation is recommended if buildings are demolished. The soil testing would target the building foot print (data gap) and also the potential for residual asbestos following removal of onsite structures. Further testing is recommended at the composite sample locations to assess the soil contamination status (i.e. 8 sample locations).

## Figures & Plates





## Site Location

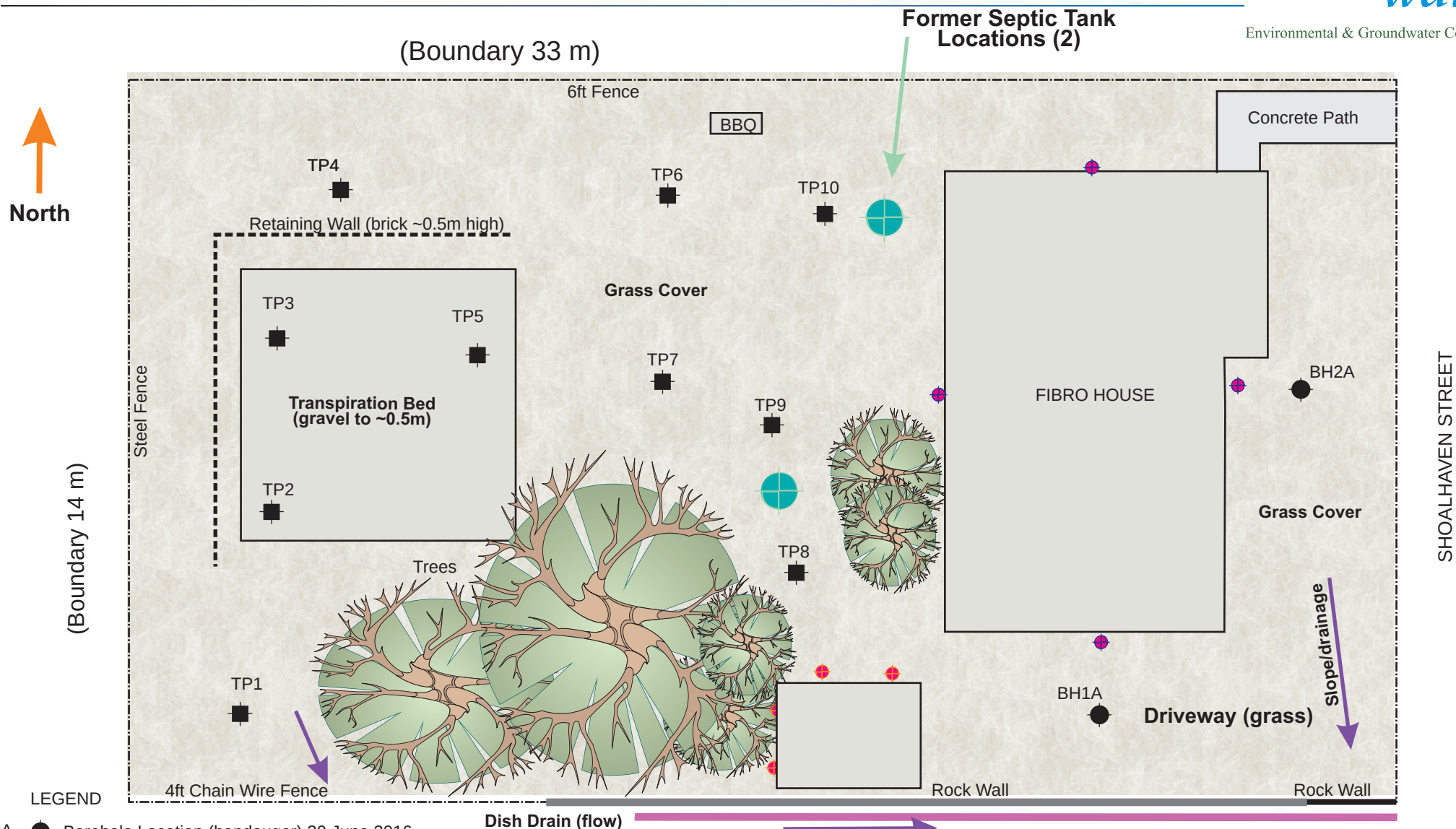
Date: 4 July 2016

Reference: E2W\_247\_01.cdr

KMC - 104 SHOALHAVEN STREET, KIAMA, NSW

Figure 1





**LEGEND**

- BH-2A ● Borehole Location (handauger) 30 June 2016
- TP-1 ■ Testpit Location (excavated with 3 t machine) 30 June 2016
- House C-1 ● Composite House Sample (4 sub, Brown Loam 0-0.05m)
- Shed C-1 ● Composite Shed C-1 (4 sub, Brown Loam 0-0.05m)

Schematic diagram - approximate scale

## Site Plan & Soil Investigation Locations (30 June 2016)

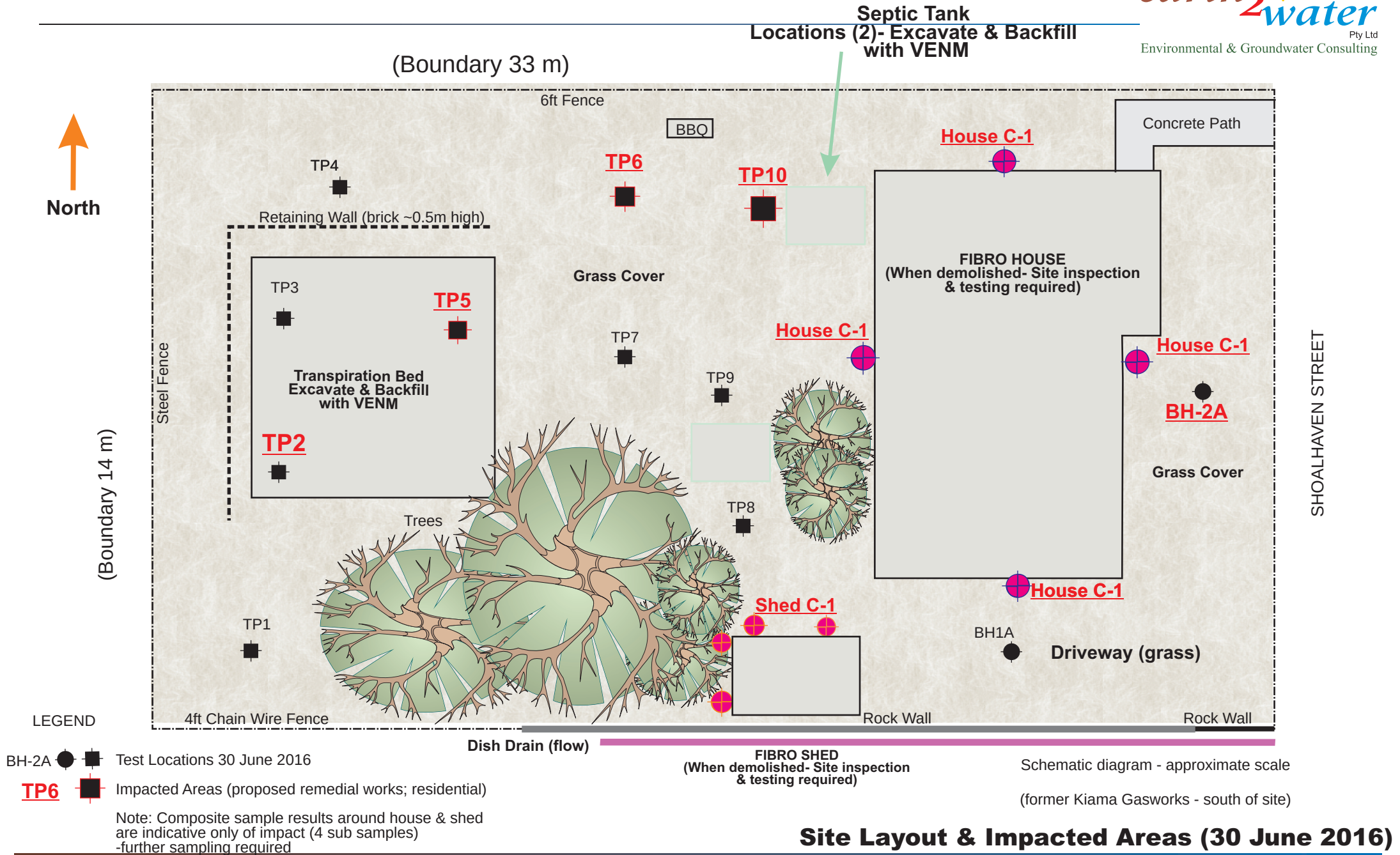
Date: 4 July 2016

Reference: E2W\_247\_02.cdr

KMC - 104 SHOALHAVEN STREET, KIAMA, NSW

Figure 2









**Plate 1** (30 June 2016) View of rear yard at 104 Shoalhaven Street, Kiama. The retaining wall marks the area of the former transpiration bed. Several testpits (TP-2 & 3 and 5) are visible at the centre of the frame and location of transpiration bed. **Plate 2** showing the aged fibro and brick constructed house and front yard. **Plate 3** viewing east over the side driveway and location of BH-1 (next to yellow bin). **Plate 4** showing the rock wall and stormwater drain on the southern boundary. **Plate 5** showing the fibro garden shed located on the rear yard and south boundary.







**Plates 6,7,&8** (30 June 2016) View of selected test pits (TP-1,4,5) and soil sample types located in the year yard (clay loam overlying coke ash and blue metal gravel to approximately 0.5m depth, underlain by weathered siltstone or silty clay). TP-04 located on the elevated northwest boundary of the site comprises clay loam and silty clay (no coke ash or gravel as its outside of the transpiration bed of approximately 80 m2).



**Plate 9** (30 June 2016) Sample location (BH-2) located on the front garden and thick grass cover. Soil comprises clay loam overlying stiff brown silty clay.

## Tables



**Table 1 - Soil Sampling Register (Residential; 104 Shoalhaven St, Kiama)**

30 June 2016

| Test & Sample ID | Date         | Sample ID & Depth (mbgl)                 | Sample Description                                                                                                                                                                                                                                                                                                                   | Laboratory Analyses |
|------------------|--------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| BH-1A            | 30 June 2016 | BH-1A 0-0.2m                             | Grass cover, middle of drive way next to house<br>0-0.2m: (FILL?) Clay Loam – medium brown, stiff, moist, plastic, uniform, no odour                                                                                                                                                                                                 | ALS: 1              |
| BH-2A            | 30 June 2016 | BH-2A 0-0.2m                             | Grass cover, front yard in front of house<br>0-0.2m: (FILL?) Clay Loam – medium brown, stiff, moist, plastic, uniform, no odour                                                                                                                                                                                                      | ALS: 2 & TCLP-PAH   |
| TP-1             | 30 June 2016 | TP-1A 0-0.3m<br>TP-1B 0.4-0.5m           | Grass cover- south west corner of yard (former transpiration bed)<br>0-0.4m: FILL (Clay Loam & Gravel) – medium brown & grey, transpiration bed comprising dark grey coke ash gravel and blue metal, loose-firm, no odour.<br>0.4- 0.5 m: Silty Clay – medium brown, stiff, uniform, moist, no odour                                 | ALS: 1<br>ALS: 6    |
| TP-2             | 30 June 2016 | TP-2A 0-0.3m<br>TP-2B 0.5-0.6m           | Grass cover- south west corner of yard (former transpiration bed)<br>0-0.5m: FILL (Clay Loam & Gravel) – medium brown & grey, transpiration bed comprising dark grey coke ash gravel and blue metal, loose-firm, no odour.<br>0.5- 0.6 m: FILL (Silty Clay & gravel)– medium brown, stiff, minor coke ash gravel, moist, no odour    | ALS:1<br>ALS:3& 6   |
| TP-3             | 30 June 2016 | TP-3A 0-0.3m                             | Grass cover- rear west end of yard (former transpiration bed)<br>0-0.5m: FILL (Clay Loam & Gravel) – medium brown & grey, transpiration bed comprising dark grey coke ash gravel and blue metal, loose-firm, no odour.<br>0.5- 0.6 m: Silty Clay/Siltstone bedrock – medium brown, stiff, uniform, moist, no odour (refusal on rock) | ALS: 2              |
| TP-4             | 30 June 2016 | TP4A 0-0.3m/<br>DUP-01<br>TP-4B 0.5-0.6m | Grass cover- north west corner of yard<br>0-0.6m: Clay Loam & Silty Clay– medium brown, stiff, moist, plastic, uniform, no odour<br>Weathered brown siltstone at 0.5m depth                                                                                                                                                          | ALS: 1              |
| TP-5             | 30 June 2016 | TP-5A 0-0.3m<br>TP-5B 0.5m               | Grass cover- middle section of yard (former transpiration bed)<br>0-0.5m: FILL (Clay Loam & Gravel) – medium brown & grey, transpiration bed comprising dark grey coke ash gravel and blue metal, loose-firm, no odour.<br>0.5- 0.6 m: Silty Clay – medium brown, stiff, uniform, moist, no odour                                    | ALS: 1              |
| TP-6             | 30 June 2016 | TP-6A 0-0.3m                             | Grass cover- middle section of yard<br>0-0.5m: Clay Loam & Silty Clay– medium brown, stiff, moist, plastic, uniform, no odour<br>Weathered brown siltstone at 0.5m depth                                                                                                                                                             | ALS: 2 & TCLP-Pb    |

|           |              |                                      |                                                                                                                                                                                                                                                                                                          |                        |
|-----------|--------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| TP-7      | 30 June 2016 | TP-7A 0-0.3m                         | <i>Grass cover- middle section of yard</i><br>0-0.5m: Clay Loam & Silty Clay (fill?) – medium brown, stiff, moist, plastic, uniform, no odour (metal galvanised pipe)                                                                                                                                    | ALS: 6                 |
| TP-8      | 30 June 2016 | TP-8A 0-0.3m<br>TP-8B 0.5m           | <i>Grass cover- middle section of yard (former septic tank area)</i><br>0-0.6m: FILL (Clay Loam & Gravel) – medium brown & grey, some concrete boulders/slabs & gravel, some bricks and coke ash, loose-firm, no odour.<br>Water ingress to approx 0.4m bgl                                              | ALS: 2<br>ALS: 3       |
| TP-9      | 30 June 2016 | TP-9A 0-0.3m                         | <i>Grass cover- middle section of yard</i><br>0-0.5m: FILL (Clay Loam & Gravel) – medium brown & grey, some concrete boulders/slabs & gravel, some scrap metal (pipe), tree roots, loose-firm, no odour.<br>0.5- 0.6 m: Silty Clay & Weathered Siltstone – medium brown, stiff, uniform, moist, no odour | ALS: 4                 |
| TP-10     | 30 June 2016 | TP-10A 0-0.3m<br>TP-10B 0.5-0.7m     | <i>Grass cover- north east corner of yard, near house</i><br>0-0.6m: Clay Loam & Silty Clay– medium brown, stiff, moist, plastic, uniform, no odour                                                                                                                                                      | ALS: 1<br>ALS: 6       |
| Shed-C1   | 30 June 2016 | 0-0.1m<br>Composite of 4 sub samples | <i>Shallow Soils collected from around garden shed</i><br>0-0.1m: FILL (Loam) – medium brown, trace of fine gravel, organic matter (leaf litter, grass roots) some debris (glass, plaster), loose, no odour                                                                                              | ALS: 1<br>TCLP-Pb & Zn |
| House C-1 | 30 June 2016 | 0-0.1m<br>Composite of 4 sub samples | <i>Shallow Soils collected from around house</i><br>0-0.1m: FILL (Loam) – medium brown, trace of fine gravel, organic matter (leaf litter, grass roots) some debris (gravels, glass, plaster), loose, no odour                                                                                           | ALS: 1                 |

Notes:

- Samples collected by Earth2Water Pty Ltd on 30 June 2016 by using trowel or hand auger from testpits, or borehole.
- Laboratory analyses (ALS):
 

|                                              |                                           |
|----------------------------------------------|-------------------------------------------|
| 1 = TPH/BTEX/PAH/8 metals/cyanide & asbestos | 2= TPH/BTEX/PAH/8 metals/OCP/PCB/asbestos |
| 3= TPH/BTEX                                  | 4=PAHs & Asbestos                         |
|                                              | 5=TCLP analyses (metals or PAH)           |
|                                              | 6=PAH                                     |
- NA= Not Analysed

Table 2 - Soil Analytical Results (Kiama, 30 June 2016)

| Analyte                                           | Units | LOR  | DECC 2008 - Waste Classification | NEPM 2013 HSLs*/HILs (A) | NEPM 2013 Management Limits^ | NEPM 2013 ESLs^^ | NSW EPA Guidelines (1994) | BH-1A            | BH-2A           | TP-1A               | TP-1B               | TP-2A                 | TP-2B               | TP-3A               | TP-4A      |
|---------------------------------------------------|-------|------|----------------------------------|--------------------------|------------------------------|------------------|---------------------------|------------------|-----------------|---------------------|---------------------|-----------------------|---------------------|---------------------|------------|
|                                                   |       |      |                                  |                          |                              |                  |                           | Sample Depth (m) | 30/06/2016      | 30/06/2016          | 30/06/2016          | 30/06/2016            | 30/06/2016          | 30/06/2016          | 30/06/2016 |
| Moisture Content (dried @ 103°C)                  | %     | 1    |                                  |                          |                              |                  |                           | 0-0.2m           | 0-0.2m          | 0-0.3m              | 0.4-0.5m            | 0-0.3m                | 0.5-0.6m            | 0-0.3m              | 0-0.3m     |
| Asbestos                                          |       |      |                                  |                          |                              |                  |                           | 18.3             | 26.1            | 27.7                | 22.9                | 29.9                  | 11.8                | 27.4                | 23.8       |
| Asbestos Detected                                 | g/kg  | 0.1  | NA'                              |                          |                              |                  |                           | No               | No              | No                  | No                  | No                    | ----                | No                  | No         |
| Asbestos Type                                     | --    | 0.1  |                                  |                          |                              |                  |                           | ND               | ND              | ND                  | ND                  | ND                    | ----                | ND                  | ND         |
| Description                                       | -     | -    |                                  |                          |                              |                  |                           | fill- clay loam  | fill- clay loam | fill- clay & gravel | fill- clay & gravel | fill- clay loam       | fill- clay & gravel | fill- clay & gravel | clay loam  |
| <b>Total Metals</b>                               |       |      |                                  |                          |                              |                  |                           |                  |                 |                     |                     |                       |                     |                     |            |
| Arsenic                                           | mg/kg | 5    | 100                              | 100                      |                              |                  |                           | <5               | <5              | 5                   | ----                | <5                    | ----                | <5                  | <5         |
| Cadmium                                           | mg/kg | 1    | 20                               | 20                       |                              |                  |                           | <1               | 4               | <1                  | ----                | <1                    | ----                | <1                  | <1         |
| Chromium (total)                                  | mg/kg | 2    |                                  | 100 (VI)                 |                              |                  |                           | 17               | 12              | 14                  | ----                | 9                     | ----                | 11                  | 19         |
| Copper                                            | mg/kg | 5    | 100                              | 7000                     |                              |                  |                           | 54               | 61              | 86                  | ----                | 83                    | ----                | 62                  | 54         |
| Lead                                              | mg/kg | 5    | 100 (1500, TCLP<5 mg/L)          | 300                      |                              |                  |                           | 66               | 110             | 19                  | ----                | 62                    | ----                | 50                  | 68         |
| Nickel                                            | mg/kg | 2    | 40                               | 3000                     |                              |                  |                           | 4                | 5               | 9                   | ----                | 6                     | ----                | 5                   | 4          |
| Zinc                                              | mg/kg | 5    |                                  | 8000                     |                              |                  |                           | 155              | 1210            | 83                  | ----                | 217                   | ----                | 186                 | 414        |
| Mercury                                           | mg/kg | 0.1  | 4                                | 200                      |                              |                  |                           | <0.1             | <0.1            | <0.1                | ----                | 0.2                   | ----                | <0.1                | <0.1       |
| Total Cyanide                                     | mg/kg | 1    |                                  | 250                      |                              |                  |                           | <1               | <1              | <1                  | ----                | <1                    | ----                | ----                | <1         |
| Total Polychlorinated biphenyls                   | mg/kg | 0.1  |                                  | 1                        |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.1                | ----       |
| <b>Organochlorine Pesticides (OCP)</b>            |       |      |                                  |                          |                              |                  |                           |                  |                 |                     |                     |                       |                     |                     |            |
| Heptachlor                                        | mg/kg | 0.05 |                                  | 7                        |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| Aldrin                                            | mg/kg | 0.05 |                                  | 7                        |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| Dieldrin                                          | mg/kg | 0.05 |                                  |                          |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| Endrin                                            | mg/kg | 0.05 |                                  | 10                       |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| Endosulfan (sum)                                  | mg/kg | 0.05 |                                  | 300                      |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| cis-Chlordane                                     | mg/kg | 0.05 |                                  | 50                       |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| 4,4'-DDE                                          | mg/kg | 0.05 |                                  |                          |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| 4,4'-DDT                                          | mg/kg | 0.2  |                                  | 260                      |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.2                | ----       |
| 4,4'-DDD                                          | mg/kg | 0.05 |                                  |                          |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| Sum of DDD + DDE + DDT                            | mg/kg | 0.05 |                                  |                          |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| Sum of Aldrin + Dieldrin                          | mg/kg | 0.05 |                                  |                          |                              |                  |                           | ----             | ----            | ----                | ----                | ----                  | ----                | <0.05               | ----       |
| <b>Polynuclear Aromatic Hydrocarbons</b>          |       |      |                                  |                          |                              |                  |                           |                  |                 |                     |                     |                       |                     |                     |            |
| Naphthalene                                       | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | <0.5                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Acenaphthylene                                    | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | <0.5                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Acenaphthene                                      | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | <0.5                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Fluorene                                          | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | <0.5                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Phenanthrene                                      | mg/kg | 0.5  |                                  |                          |                              |                  |                           | 0.5              | 0.6             | 0.6                 | <0.5                | 1.6                   | <0.5                | 0.7                 | <0.5       |
| Anthracene                                        | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | <0.5                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Fluoranthene                                      | mg/kg | 0.5  |                                  |                          |                              |                  |                           | 1.1              | 1.2             | 1.2                 | <0.5                | 2.8                   | <0.5                | 1.2                 | <0.5       |
| Pyrene                                            | mg/kg | 0.5  |                                  |                          |                              |                  |                           | 1                | 1.1             | 1.2                 | <0.5                | 2.7                   | <0.5                | 1.1                 | <0.5       |
| Benz(a)anthracene                                 | mg/kg | 0.5  |                                  |                          |                              |                  |                           | 0.7              | 0.8             | 0.6                 | <0.5                | 1.5                   | <0.5                | 0.6                 | <0.5       |
| Chrysene                                          | mg/kg | 0.5  |                                  |                          |                              |                  |                           | 0.6              | 0.7             | 0.5                 | <0.5                | 1.4                   | <0.5                | <0.5                | <0.5       |
| Benzo(b)fluoranthene                              | mg/kg | 0.5  |                                  |                          |                              |                  |                           | 0.8              | 1.1             | 0.6                 | <0.5                | 1.6                   | <0.5                | <0.5                | <0.5       |
| Benzo(k)fluoranthene                              | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | <0.5                | 0.6                   | <0.5                | <0.5                | <0.5       |
| Benzo(a)pyrene                                    | mg/kg | 0.5  | 0.8 (10, TCLP<0.04 mg/L)         | 3                        |                              | 0.7 & 1.4#       | 1                         | 0.7              | 0.9             | 0.5                 | <0.5                | 1.3 (TCLP=<1 ug/L)    | <0.5                | <0.5                | <0.5       |
| Indeno(1,2,3-cd)pyrene                            | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | 0.5             | <0.5                | <0.5                | 0.6                   | <0.5                | <0.5                | <0.5       |
| Dibenz(a,h)anthracene                             | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | <0.5                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Benzo(g,h,i)perylene                              | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | 0.6             | <0.5                | <0.5                | 0.8                   | <0.5                | <0.5                | <0.5       |
| BaP TEF (half LOR)                                | mg/kg | 0.5  |                                  | 3                        |                              |                  |                           | 1.2              | 1.4             | 0.9                 | 0.6                 | 2                     | 0.6                 | 0.6                 | 0.6        |
| Sum of PAH                                        | mg/kg | 0.5  | 200                              | 300                      |                              |                  | 20                        | 5.4              | 7.5             | 5.2                 | ND                  | 14.9 (TCLP=<0.5 ug/L) | ND                  | 3.6                 | ND         |
| <b>BTEX</b>                                       |       |      |                                  |                          |                              |                  |                           |                  |                 |                     |                     |                       |                     |                     |            |
| Benzene                                           | mg/kg | 0.2  | 10                               | 1                        |                              | 50               | 1                         | <0.2             | <0.2            | <0.2                | ----                | <0.2                  | <0.2                | <0.2                | <0.2       |
| Toluene                                           | mg/kg | 0.5  | 288                              | 1500                     |                              | 85               | 130                       | <0.5             | <0.5            | <0.5                | ----                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Ethylbenzene                                      | mg/kg | 0.5  | 600                              | 390                      |                              | 70               | 50                        | <0.5             | <0.5            | <0.5                | ----                | <0.5                  | <0.5                | <0.5                | <0.5       |
| meta- & para-Xylene                               | mg/kg | 0.5  | 1000                             | 260                      |                              |                  |                           | <0.5             | <0.5            | <0.5                | ----                | <0.5                  | <0.5                | <0.5                | <0.5       |
| ortho-Xylene                                      | mg/kg | 0.5  |                                  |                          |                              | 105              | 25                        | <0.5             | <0.5            | <0.5                | ----                | <0.5                  | <0.5                | <0.5                | <0.5       |
| <b>BTEXN</b>                                      |       |      |                                  |                          |                              |                  |                           |                  |                 |                     |                     |                       |                     |                     |            |
| Sum of BTEX                                       | mg/kg | 0.2  |                                  |                          |                              |                  |                           | <0.2             | <0.2            | <0.2                | ----                | <0.2                  | <0.2                | <0.2                | <0.2       |
| Total Xylenes                                     | mg/kg | 0.5  |                                  |                          |                              |                  |                           | <0.5             | <0.5            | <0.5                | ----                | <0.5                  | <0.5                | <0.5                | <0.5       |
| Naphthalene                                       | mg/kg | 1    |                                  | 0.9                      |                              |                  |                           | <1               | <1              | <1                  | ----                | <1                    | <1                  | <1                  | <1         |
| <b>Total Recoverable Hydrocarbons - NEPM 2013</b> |       |      |                                  |                          |                              |                  |                           |                  |                 |                     |                     |                       |                     |                     |            |
| C6 - C10 Fraction                                 | mg/kg | 10   |                                  |                          |                              |                  |                           | <10              | <10             | <10                 | ----                | <10                   | <10                 | <10                 | <10        |
| C6 - C10 Fraction minus BTEX (F1)                 | mg/kg | 10   | 650                              | 210                      | 700                          | 180              |                           | <10              | <10             | <10                 | ----                | <10                   | <10                 | <10                 | <10        |
| >C10 - C16 Fraction                               | mg/kg | 50   |                                  | 160                      | 1000                         | 120              |                           | <50              | <50             | <50                 | ----                | <50                   | <50                 | <50                 | <50        |
| >C16 - C34 Fraction                               | mg/kg | 100  |                                  |                          | 2500                         | 300              |                           | <100             | <100            | <100                | ----                | 180                   | 110                 | <100                | <100       |
| >C34 - C40 Fraction                               | mg/kg | 100  |                                  |                          | 10000                        | 2800             |                           | <100             | <100            | <100                | ----                | <100                  | <100                | <100                | <100       |
| >C10 - C40 Fraction (sum)                         | mg/kg | 50   | 10000                            |                          |                              |                  |                           | <50              | <50             | <50                 | ----                | 180                   | 110                 | <50                 | <50        |

**NOTES:**

#= guidelines divided (4) as four sub samples collected in composite samples (Shed C-1, House C-1)- indicative only of contamination status

LOR = laboratory limits of reporting NA = not available NT = not tested ND = not detected

\*NEPM 2013 Health Screening Level (HSL) for vapour intrusion HSL A Residential (Low Density) Sand, 0-1m \*\* NEPM 2013 Health-based Investigation Levels - HIL A Residential (with garden/accessible soil)

^NEPM 2013 Management Limits for TPH fractions F1-F4 in soil - low density Residential/course soil type (transpiration beds have gravels and fill is variable with gravel)

^^NEPM 2013 Ecological Screening Level (ESLs) for TPH fractions F1 - F4, BTEX and benzo(a)pyrene in soil - Urban residential, coarse soil type (fine soil type has higher guidelines)

BaP TEF (half LOR)= sum of carcinogenic PAHs (using half LOR for calculation)

NEPM (2013) ESL = low reliability for variable land uses Urban residential and public open space. Guidelines (BaP) =0.7 mg/kg course soil, 1.4 mg/kg for fine soil



Table 2 - Soil Analytical Results (Kiama, 30 June 2016)

| Analyte                                    | Units | LOR  | DECC 2008 - Waste Classification | NEPM 2013 HSLs*HILs (A) | NEPM 2013 Management Limits^ | NEPM 2013 ESLs^^ | NSW EPA Guidelines (1994) | TP-5A               | TP-5B      | TP-6A               | TP-7A               | TP-8A               | TP-8B      | TP-9A               | TP-10A              | TP-10B     | SHED C-1 #          | HOUSE C-1 # |
|--------------------------------------------|-------|------|----------------------------------|-------------------------|------------------------------|------------------|---------------------------|---------------------|------------|---------------------|---------------------|---------------------|------------|---------------------|---------------------|------------|---------------------|-------------|
|                                            |       |      |                                  |                         |                              |                  |                           | 30/06/2016          | 30/06/2016 | 30/06/2016          | 30/06/2016          | 30/06/2016          | 30/06/2016 | 30/06/2016          | 30/06/2016          | 30/06/2016 | 30/06/2016          | 30/06/2016  |
|                                            |       |      |                                  |                         |                              |                  |                           | 0-0.3m              | 0.5m       | 0-0.3m              | 0-0.3m              | 0.5m                | 0-0.3m     | 0-0.3m              | 0.5m                | 0-0.3m     | 0.5-0.7m            | 0-0.1m      |
|                                            |       |      |                                  |                         |                              |                  |                           | Sample Depth (m)    |            |                     |                     |                     |            |                     |                     |            |                     |             |
| Moisture Content (dried @ 103°C)           | %     | 1    |                                  |                         |                              |                  |                           | 36.2                | 27.1       | 25.7                | 22.5                | 28.8                | 34.4       | 24.3                | 25.8                | 26         | 47.7                | 28.5        |
| Asbestos                                   |       |      |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| Asbestos Detected                          | g/kg  | 0.1  | NA^                              |                         |                              |                  |                           | No                  | ----       | No                  | No                  | No                  | ----       | No                  | No                  |            | No                  | No          |
| Asbestos Type                              | --    | 0.1  |                                  |                         |                              |                  |                           | ND                  |            | ND                  | ND                  | ND                  |            | ND                  | ND                  |            | ND                  | ND          |
| Description                                | -     | -    |                                  |                         |                              |                  |                           | fill- clay & gravel | clay loam  | fill- clay & gravel | fill- clay & gravel | fill- clay & gravel | clay loam  | fill- clay & gravel | fill- clay & gravel | clay loam  | loam                | loam        |
| Total Metals                               |       |      |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| Arsenic                                    | mg/kg | 5    | 100                              | 100                     |                              |                  |                           | <5                  | ----       | 7                   | ----                | <5                  | ----       | ----                | 11                  | ----       | <5                  | 6           |
| Cadmium                                    | mg/kg | 1    | 20                               | 20                      |                              |                  |                           | <1                  | ----       | <1                  | ----                | <1                  | ----       | ----                | <1                  | ----       | 6                   | <1          |
| Chromium (total)                           | mg/kg | 2    |                                  | 100 (VI)                |                              |                  |                           | 8                   | ----       | 13                  | ----                | 10                  | ----       | ----                | 17                  | ----       | 110                 | 25          |
| Copper                                     | mg/kg | 5    | 100                              | 7000                    |                              |                  |                           | 81                  | ----       | 61                  | ----                | 60                  | ----       | ----                | 87                  | ----       | 277                 | 95          |
| Lead                                       | mg/kg | 5    | 100 (1500, TCLP<5 mg/L)          | 300                     |                              |                  |                           | 64                  | ----       | 403 (TCLP<0.1 mg/L) | ----                | 82                  | ----       | ----                | 240 (TCLP<0.1 mg/L) | ----       | 288 (TCLP<0.1 mg/L) | 370         |
| Nickel                                     | mg/kg | 2    | 40                               | 3000                    |                              |                  |                           | 5                   | ----       | 7                   | ----                | 6                   | ----       | ----                | 10                  | ----       | 21                  | 10          |
| Zinc                                       | mg/kg | 5    |                                  | 8000                    |                              |                  |                           | 249                 | ----       | 374                 | ----                | 269                 | ----       | ----                | 844                 | ----       | 6590 (TCLP<20.7)    | 1840        |
| Mercury                                    | mg/kg | 0.1  | 4                                | 200                     |                              |                  |                           | 0.2                 | ----       | 0.6                 | ----                | 0.1                 | ----       | ----                | 0.1                 | ----       | 0.2                 | 0.1         |
| Total Cyanide                              | mg/kg | 1    |                                  | 250                     |                              |                  |                           | 2                   | ----       | ----                | ----                | ----                | ----       | ----                | 2                   | ----       | ----                | ----        |
| Total Polychlorinated biphenyls            | mg/kg | 0.1  |                                  | 1                       |                              |                  |                           | ----                | ----       | <0.1                | ----                | <0.1                | ----       | ----                | ----                | ----       | ----                | ----        |
| Organochlorine Pesticides (OCP)            |       |      |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| Heptachlor                                 | mg/kg | 0.05 |                                  | 7                       |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| Aldrin                                     | mg/kg | 0.05 |                                  | 7                       |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| Dieldrin                                   | mg/kg | 0.05 |                                  |                         |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| Endrin                                     | mg/kg | 0.05 |                                  | 10                      |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| Endosulfan (sum)                           | mg/kg | 0.05 |                                  | 300                     |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| cis-Chlordane                              | mg/kg | 0.05 |                                  | 50                      |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| 4,4'-DDE                                   | mg/kg | 0.05 |                                  |                         |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| 4,4'-DDT                                   | mg/kg | 0.2  |                                  | 260                     |                              |                  |                           | ----                | ----       | <0.2                | ----                | <0.2                | ----       | ----                | ----                | ----       | ----                | ----        |
| 4,4'-DDD                                   | mg/kg | 0.05 |                                  |                         |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| Sum of DDD + DDE + DDT                     | mg/kg | 0.05 |                                  |                         |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| Sum of Aldrin + Dieldrin                   | mg/kg | 0.05 |                                  |                         |                              |                  |                           | ----                | ----       | <0.05               | ----                | <0.05               | ----       | ----                | ----                | ----       | ----                | ----        |
| Polynuclear Aromatic Hydrocarbons          |       |      |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| Naphthalene                                | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | <0.5                | <0.5       | <0.5                | <0.5        |
| Acenaphthylene                             | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | <0.5                | <0.5       | <0.5                | <0.5        |
| Acenaphthene                               | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | <0.5                | <0.5       | <0.5                | <0.5        |
| Fluorene                                   | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | <0.5                | <0.5       | <0.5                | <0.5        |
| Phenanthrene                               | mg/kg | 0.5  |                                  |                         |                              |                  |                           | 1                   | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | 0.8                 | <0.5       | <0.5                | <0.5        |
| Anthracene                                 | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | <0.5                | <0.5       | <0.5                | <0.5        |
| Fluoranthene                               | mg/kg | 0.5  |                                  |                         |                              |                  |                           | 1.8                 | <0.5       | 0.6                 | 0.7                 | 0.7                 | ----       | 0.6                 | 1.6                 | <0.5       | 0.9                 | 0.8         |
| Pyrene                                     | mg/kg | 0.5  |                                  |                         |                              |                  |                           | 1.8                 | <0.5       | 0.6                 | 0.7                 | 0.6                 | ----       | 0.6                 | 1.5                 | <0.5       | 0.9                 | 0.8         |
| Benz(a)anthracene                          | mg/kg | 0.5  |                                  |                         |                              |                  |                           | 1.1                 | <0.5       | <0.5                | 0.5                 | <0.5                | ----       | <0.5                | 1                   | <0.5       | 0.5                 | 0.5         |
| Chrysene                                   | mg/kg | 0.5  |                                  |                         |                              |                  |                           | 1                   | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | 0.9                 | <0.5       | <0.5                | <0.5        |
| Benzo(b)fluoranthene                       | mg/kg | 0.5  |                                  |                         |                              |                  |                           | 1.2                 | <0.5       | 0.6                 | 0.7                 | <0.5                | ----       | <0.5                | 1.4                 | <0.5       | 0.6                 | 0.6         |
| Benzo(k)fluoranthene                       | mg/kg | 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                             | mg/kg | 0.5  | 0.8 (10,TCLP<0.04 mg/L)          | 3                       |                              | 0.7 & 1.4#       | 1                         | 1                   | <0.5       | <0.5                | 0.6                 | <0.5                | ----       | <0.5                | 1.1                 | <0.5       | 0.5                 | 0.5         |
| Indeno(1,2,3-cd)pyrene                     | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | 0.6                 | <0.5       | <0.5                | <0.5        |
| Dibenz(a,h)anthracene                      | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | <0.5                | <0.5       | <0.5                | <0.5        |
| Benzo(g,h,i)perylene                       | mg/kg | 0.5  |                                  |                         |                              |                  |                           | 0.6                 | <0.5       | <0.5                | <0.5                | <0.5                | ----       | <0.5                | 0.8                 | <0.5       | <0.5                | <0.5        |
| BaP TEF (half LOR)                         | mg/kg | 0.5  |                                  | 3                       |                              |                  |                           | 1.5                 | 0.6        | 0.6                 | 1                   | 0.6                 | ----       | 0.6                 | 1.7                 | 0.6        | 0.9                 | 0.9         |
| Sum of PAH                                 | mg/kg | 0.5  | 200                              | 300                     |                              |                  | 20                        | 9.5                 | ND         | 1.8                 | 3.2                 | 1.3                 | ----       | 1.2                 | 10.2                | ND         | 3.4                 | 3.2         |
| BTEX                                       |       |      |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| Benzene                                    | mg/kg | 0.2  | 10                               | 1                       |                              | 50               | 1                         | <0.2                | <0.2       | <0.2                | ----                | <0.2                | <0.2       | ----                | <0.2                | ----       | <0.2                | <0.2        |
| Toluene                                    | mg/kg | 0.5  | 288                              | 1500                    |                              | 85               | 130                       | <0.5                | <0.5       | <0.5                | ----                | <0.5                | <0.5       | ----                | <0.5                | ----       | <0.5                | <0.5        |
| Ethylbenzene                               | mg/kg | 0.5  | 600                              | 390                     |                              | 70               | 50                        | <0.5                | <0.5       | <0.5                | ----                | <0.5                | <0.5       | ----                | <0.5                | ----       | <0.5                | <0.5        |
| meta- & para-Xylene                        | mg/kg | 0.5  | 1000                             | 260                     |                              | 105              | 25                        | <0.5                | <0.5       | <0.5                | ----                | <0.5                | <0.5       | ----                | <0.5                | ----       | <0.5                | <0.5        |
| ortho-Xylene                               | mg/kg | 0.5  |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| BTEXN                                      |       |      |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| Sum of BTEX                                | mg/kg | 0.2  |                                  |                         |                              |                  |                           | <0.2                | <0.2       | <0.2                | ----                | <0.2                | <0.2       | ----                | <0.2                | ----       | <0.2                | <0.2        |
| Total Xylenes                              | mg/kg | 0.5  |                                  |                         |                              |                  |                           | <0.5                | <0.5       | <0.5                | ----                | <0.5                | <0.5       | ----                | <0.5                | ----       | <0.5                | <0.5        |
| Naphthalene                                | mg/kg | 1    |                                  | 0.9                     |                              |                  |                           | <1                  | <1         | <1                  | ----                | <1                  | <1         | ----                | <1                  | ----       | <1                  | <1          |
| Total Recoverable Hydrocarbons - NEPM 2013 |       |      |                                  |                         |                              |                  |                           |                     |            |                     |                     |                     |            |                     |                     |            |                     |             |
| C6 - C10 Fraction                          | mg/kg | 10   |                                  |                         |                              |                  |                           | <10                 | <10        | <10                 | ----                | <10                 | <10        | ----                | <10                 | ----       | <10                 | <10         |
| C6 - C10 Fraction minus BTEX (F1)          | mg/kg | 10   | 650                              | 210                     | 700                          | 180              |                           | <10                 | <10        | <10                 | ----                | <10                 | <10        | ----                | <10                 | ----       | <10                 | <10         |
| >C10 - C16 Fraction                        | mg/kg | 50   |                                  | 160                     | 1000                         | 120              |                           | <50                 | <50        | <50                 | ----                | <50                 | <50        | ----                | <50                 | ----       | <50                 | <50         |
| >C16 - C34 Fraction                        | mg/kg | 100  |                                  |                         | 2500                         | 300              |                           | 170                 | <100       | <100                | ----                | <100                | <100       | ----                | 100                 | ----       | 370                 | 230         |
| >C34 - C40 Fraction                        | mg/kg | 100  |                                  |                         | 10000                        | 2800             |                           | 100                 | <100       | <100                | ----                | <100                | <100       | ----                | <100                | ----       | 280                 | 160         |
| >C10 - C40 Fraction (sum)                  | mg/kg | 50   | 10000                            |                         |                              |                  |                           | 270                 | <50        | <50                 | ----                | <50                 | <50        | ----                | 100                 | ----       | 650                 | 390         |

## NOTES:

#= guidelines divided (4) as four sub samples collected in composite

LOR = laboratory limits of reporting NA = not available NT = not tested ND = not detected

\*NEPM 2013 Health Screening Level (HSL) for vapour intrusion HSL A Residential (Low Density) Sand, 0-1m \*\* NEP

^NEPM 2013 Management Limits for TPH fractions F1-F4 in soil - low density Residential/course soil type (transpiration bec

^^NEPM 2013 Ecological Screening Level (ESLs) for TPH fractions F1 - F4, BTEX and benzo(a)pyrene in soil - Urban resid

BaP TEF (half LOR)= sum of carcinogenic PAHs (using half LOR for calculation)

NEPM (2013) ESL = low reliability for variable land uses .Urban residential and public open space. Guidelines (BaP) =0.7 m

**Table 3 - Soil Analytical Results- QA/QC (30 June 2016)**

| Analyte                                           | Units | LOR | TP-4A      | DUP-01 (BH4a) | RPD % | Comments |
|---------------------------------------------------|-------|-----|------------|---------------|-------|----------|
|                                                   |       |     | 30/06/2016 | 30/06/2016    |       |          |
|                                                   |       |     | 0-0.3m     |               |       |          |
| <b>Moisture Content (dried @ 103°C)</b>           | %     | 1   | 23.8       | 22.2          |       |          |
| <b>Asbestos</b>                                   |       |     |            |               |       |          |
| Asbestos Detected                                 | g/kg  | 0.1 | No         | No            | 0%    | OK       |
| Asbestos Type                                     | --    | 0.1 | ND         | ND            |       |          |
| Description                                       | -     | -   | clay loam  |               |       |          |
| <b>Total Metals</b>                               |       |     |            |               |       |          |
| Arsenic                                           | mg/kg | 5   | <5         | <5            | 0%    | OK       |
| Cadmium                                           | mg/kg | 1   | <1         | 1             | NA    | OK       |
| Chromium                                          | mg/kg | 2   | 19         | 14            | 30.3  | OK       |
| Copper                                            | mg/kg | 5   | 54         | 55            | 1.8   | OK       |
| Lead                                              | mg/kg | 5   | 68         | 94            | 32.1  | OK       |
| Nickel                                            | mg/kg | 2   | 4          | 4             | 0%    | OK       |
| Zinc                                              | mg/kg | 5   | 414        | 906           | 74.5  | Over     |
| Mercury                                           | mg/kg | 0.1 | <0.1       | 0.1           | NA    | OK       |
| <b>Total Cyanide</b>                              | mg/kg | 1   | <1         | <1            | 0%    | OK       |
| <b>Polynuclear Aromatic Hydrocarbons</b>          |       |     |            |               |       |          |
| Naphthalene                                       | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Acenaphthylene                                    | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Acenaphthene                                      | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Fluorene                                          | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Phenanthrene                                      | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Anthracene                                        | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Fluoranthene                                      | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Pyrene                                            | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Benz(a)anthracene                                 | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Chrysene                                          | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Benzo(b)fluoranthene                              | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Benzo(k)fluoranthene                              | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Benzo(a)pyrene                                    | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Indeno(1.2.3.cd)pyrene                            | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Dibenz(a,h)anthracene                             | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Benzo(g,h,i)perylene                              | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Sum of PAH                                        | mg/kg | 0.5 | ND         | ND            | NA    | OK       |
| <b>BTEX</b>                                       |       |     |            |               |       |          |
| Benzene                                           | mg/kg | 0.2 | <0.2       | <0.2          | NA    | OK       |
| Toluene                                           | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Ethylbenzene                                      | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| meta- & para-Xylene                               | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| ortho-Xylene                                      | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| <b>BTEXN</b>                                      |       |     |            |               |       |          |
| Sum of BTEX                                       | mg/kg | 0.2 | <0.2       | <0.2          | NA    | OK       |
| Total Xylenes                                     | mg/kg | 0.5 | <0.5       | <0.5          | NA    | OK       |
| Naphthalene                                       | mg/kg | 1   | <1         | <1            | NA    | OK       |
| <b>Total Recoverable Hydrocarbons - NEPM 2013</b> |       |     |            |               |       |          |
| C6 - C10 Fraction                                 | mg/kg | 10  | <10        | <10           | NA    | OK       |
| C6 - C10 Fraction minus BTEX (F1)                 | mg/kg | 10  | <10        | <10           | NA    | OK       |
| >C10 - C16 Fraction                               | mg/kg | 50  | <50        | <50           | NA    | OK       |
| >C16 - C34 Fraction                               | mg/kg | 100 | <100       | <100          | NA    | OK       |
| >C34 - C40 Fraction                               | mg/kg | 100 | <100       | <100          | NA    | OK       |
| >C10 - C40 Fraction (sum)                         | mg/kg | 50  | <50        | <50           | NA    | OK       |

**NOTES:**

LOR = laboratory limits of reporting

NA = not available

NT = not tested

ND = not detected

## **Appendix A- Section 149 Certificate**

## **Appendix B-** **Site Survey & Historical Aerial Photographs**



PLAN FORM 2

Signatures and seals only

THE SEAL OF THE COUNCIL OF THE MUNICIPALITY OF KIAMA was hereunto affixed on the 29th day of January, 1988 pursuant to a resolution of the Council passed on the 27th day of January, 1988.

Town Clerk

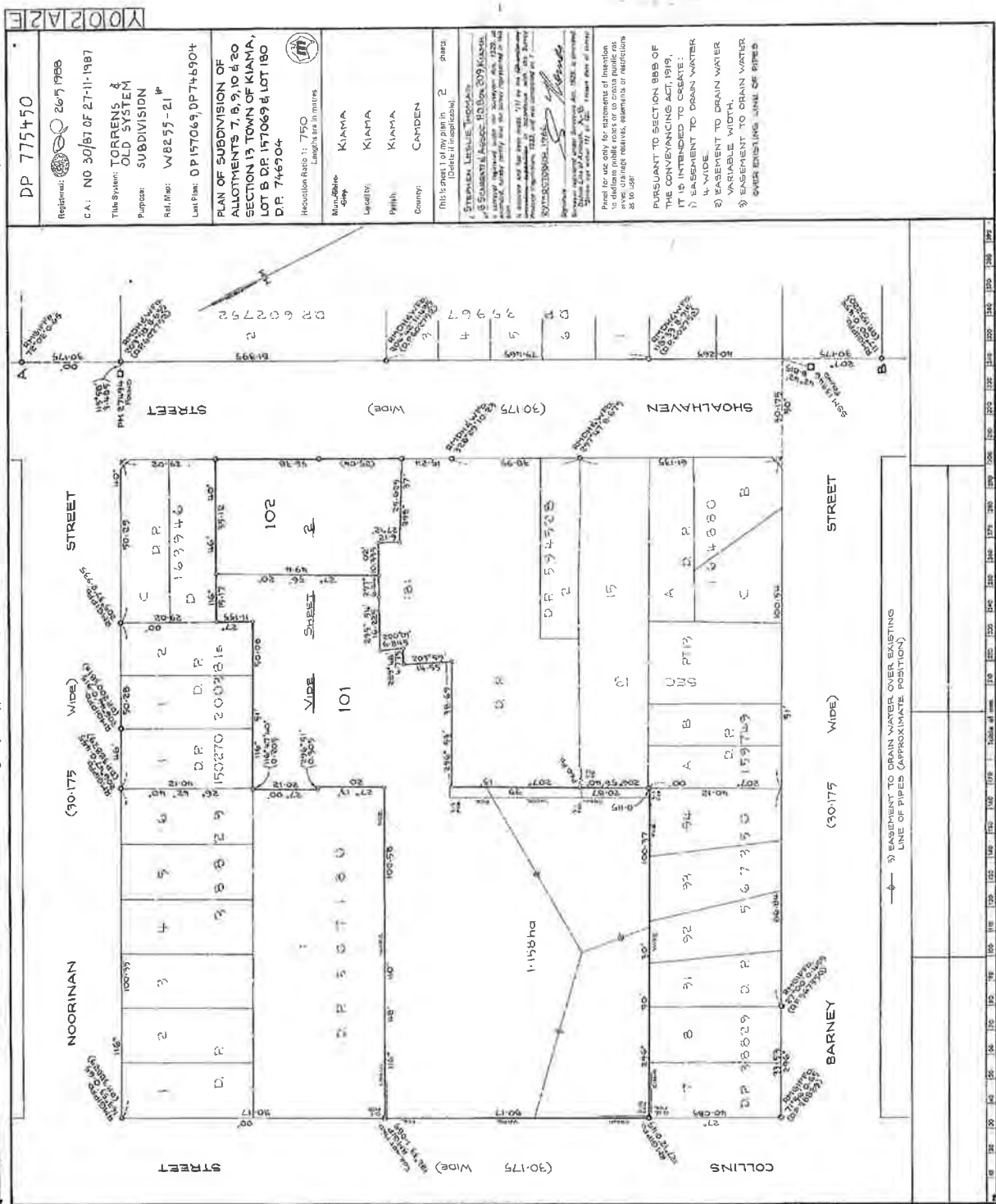
Mayor

Council Clerk's Certificate

I hereby certify that the plan shown is a true and correct copy of the original plan as submitted to the Council of the Municipality of Kiama for the purpose of the Local Government Act, 1988, and that the same has been approved by the Council of the Municipality of Kiama on the 27th day of January, 1988.

Plan Drawing only to appear in this space

OFFICE USE ONLY



SURVEYOR'S REFERENCE 10625/60/50

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day.

3rd June, 1988

10 20 30 40 50 60 70 Table of mm 110 120 130 140









## Aerial photo taken November 2003

Copyright LPI NSW 2005 Compiled by Kiama Council

Date: 20/03/07

Scale: 1:1000

This map is supplied by Council on condition that Council will not be responsible for any loss or damage which may result from any use made of the map as a result of any errors or omissions contained in the map. To establish title boundaries and ownership advice should be obtained from a surveyor, legal advisor or LPI New South Wales.

Aerial Photography is Copyright AAMHatch. AAMHatch bears no responsibility for the accuracy of overlay data supplied.



## **Appendix C- ALS Environmental Final Laboratory Reports**



# CHAIN OF CUSTODY DOCUMENTATION- EARTH2WATER PTY LTD

Environmental Division  
Sydney

Work Order Reference  
**ES1614401**



Telephone : + 61-2-8794 8555

|                                                |                                    |                                          |
|------------------------------------------------|------------------------------------|------------------------------------------|
| CLIENT: Earth2Water Pty Ltd                    | LABORATORY BATCH NO.:              | ALS Environmental                        |
| POSTAL ADDRESS: PO Box 189 Jamberoo, NSW, 2533 | SAMPLES: Dino Paratoto             | Smithfield, NSW                          |
| SEND REPORT TO: Dino Paratoto                  | PHONE: 0422 334102                 | E-MAIL: earth2w@tpg.com.au               |
| REPORT NEEDED BY: As per Hewlett's direction   | REPORT FORMAT: HAND Yes            | FAX: Yes                                 |
| DATA NEEDED BY: as stated                      | DISC <input type="checkbox"/>      | BULLETIN BOARD: <input type="checkbox"/> |
| Site: KMC House Gwoks                          | CC LEVEL: <input type="checkbox"/> | CCS1: <input type="checkbox"/>           |
| P.O. NO.: E2W-247                              | CCS2: <input type="checkbox"/>     | CCS3: Yes                                |
| COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: | CCS4: <input type="checkbox"/>     | ANALYSIS REQUIRED                        |

INVOICE to:  
Earth2Water  
KMC House (Gwoks)

Retain samples for 3 weeks prior to disposal

| SAMPLE DATA |        |         |      | ALS Containers      |     |     |   |   |   |   |
|-------------|--------|---------|------|---------------------|-----|-----|---|---|---|---|
| SAMPLE ID   | MATRIX | DATE    | TIME | TYPE & PRESERVATIVE | NO. | 1   | 2 | 3 | 4 | 5 |
| BA-1A       | soil   | 30.6.16 |      | zip + jar           |     | yes |   |   |   |   |
| BA-2A       | soil   |         |      | " "                 |     | yes |   |   |   |   |
| TP-1A       | soil   |         |      | " "                 |     | yes |   |   |   |   |
| TP-1B       | soil   |         |      | jar                 |     | yes |   |   |   |   |
| TP-2A       | soil   |         |      | jar + 2p            |     | yes |   |   |   |   |
| TP-2B       | soil   |         |      | jar 1               |     | yes |   |   |   |   |
| TP-3A       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-4A       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-4B       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-5A       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-5B       | soil   |         |      | jar                 |     | yes |   |   |   |   |
| TP-6A       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-7A       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-8A       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-8B       | soil   |         |      | jar                 |     | yes |   |   |   |   |
| TP-9A       | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-10A      | soil   |         |      | jar + 2             |     | yes |   |   |   |   |
| TP-10B      | soil   |         |      | jar                 |     | yes |   |   |   |   |
| DUP-01      | soil   |         |      | jar + 2p            |     | yes |   |   |   |   |
| Shed C-1    |        |         |      |                     |     |     |   |   |   |   |
| House C-1   |        |         |      |                     |     |     |   |   |   |   |

|                     |              |                 |              |
|---------------------|--------------|-----------------|--------------|
| NAME: Dino Paratoto | DATE:        | NAME: Dino      | DATE: 1/7/16 |
| OF: Earth2Water     | Jamberoo     | OF: Earth2Water | 10-7-2016    |
| NAME:               | TIME: 2:00pm | NAME:           | TIME: 12:45  |
| OF:                 | DATE:        | OF:             | DATE:        |
| OF:                 | TIME:        | OF:             | TIME:        |

**Laboratory Analyses**

- 1 TPH/BTEX/PAHs, 8 metals/OC/PCBs, asbestos
- 2 TPH/BTEX/PAHs, 8 metals, cyanide, asbestos
- 3 asbestos
- 4 TPH/BTEX
- 5 OCP/8 metals/asbestos
- 6 cyanide (total)
7. PAHs & Asbestos

**4 day turnaround please**

Lab / Analysis: *ALS Newcastle / Asbestos*

Organised By / Date: \_\_\_\_\_

Relinquished By / Date: \_\_\_\_\_

Connote / Courier: \_\_\_\_\_

WO No: \_\_\_\_\_

Attach By PO / Internal Staff: \_\_\_\_\_



## CERTIFICATE OF ANALYSIS

**Work Order** : **ES1614401**  
**Client** : **EARTH2WATER PTY LTD**  
**Contact** : **MR DINO PARISOTTO**  
**Address** : **PO BOX 189**  
**JAMBEROO NSW, AUSTRALIA 2533**  
**Telephone** : **+61 4236 1334**  
**Project** : **----**  
**Order number** : **E2W-247**  
**C-O-C number** : **----**  
**Sampler** : **DINO PARISOTTO**  
**Site** : **KMC HOUSE GWORKS**  
**Quote number** : **----**  
**No. of samples received** : **21**  
**No. of samples analysed** : **19**

**Page** : 1 of 19  
**Laboratory** : Environmental Division Sydney  
**Contact** :  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 01-Jul-2016 12:45  
**Date Analysis Commenced** : 04-Jul-2016  
**Issue Date** : 08-Jul-2016 17:22

NATA Accredited Laboratory 825  
 Accredited for compliance with  
 ISO/IEC 17025.



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

This Certificate of Analysis contains the following information:

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

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

### Signatories

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

| <i>Signatories</i> | <i>Position</i>        | <i>Accreditation Category</i>            |
|--------------------|------------------------|------------------------------------------|
| Ankit Joshi        | Inorganic Chemist      | Sydney Inorganics, Smithfield, NSW       |
| Celine Conceicao   | Senior Spectroscopist  | Sydney Inorganics, Smithfield, NSW       |
| Christopher Owler  | Team Leader - Asbestos | Newcastle - Asbestos, Mayfield West, NSW |
| Pabi Subba         | Senior Organic Chemist | Sydney Organics, Smithfield, NSW         |
| RICHARD TEA        | Lab technician         | Sydney Inorganics, Smithfield, NSW       |
| Shaun Spooner      | Asbestos Identifier    | Newcastle - Asbestos, Mayfield West, NSW |





## General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

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





## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                               |            |      |       | Client sample ID | BH-1A         | BH-2A         | TP-1A         | TP-1B         | TP-2A         |
|------------------------------------------------------------------|------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                                      |            |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                                         | CAS Number | LOR  | Unit  |                  | ES1614401-001 | ES1614401-002 | ES1614401-003 | ES1614401-004 | ES1614401-005 |
|                                                                  |            |      |       |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EA055: Moisture Content</b>                                   |            |      |       |                  |               |               |               |               |               |
| Moisture Content (dried @ 103°C)                                 | ----       | 1    | %     |                  | 18.3          | 26.1          | 27.7          | 22.9          | 29.9          |
| <b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b> |            |      |       |                  |               |               |               |               |               |
| 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     |                  | 356           | 326           | 171           | 45.1          | 212           |
| APPROVED IDENTIFIER:                                             | ----       | -    | --    |                  | S.SPOONER     | S.SPOONER     | S.SPOONER     | S.SPOONER     | S.SPOONER     |
| <b>EG005T: Total Metals by ICP-AES</b>                           |            |      |       |                  |               |               |               |               |               |
| Arsenic                                                          | 7440-38-2  | 5    | mg/kg |                  | <5            | <5            | 5             | ----          | <5            |
| Cadmium                                                          | 7440-43-9  | 1    | mg/kg |                  | <1            | 4             | <1            | ----          | <1            |
| Chromium                                                         | 7440-47-3  | 2    | mg/kg |                  | 17            | 12            | 14            | ----          | 9             |
| Copper                                                           | 7440-50-8  | 5    | mg/kg |                  | 54            | 61            | 86            | ----          | 83            |
| Lead                                                             | 7439-92-1  | 5    | mg/kg |                  | 66            | 110           | 19            | ----          | 62            |
| Nickel                                                           | 7440-02-0  | 2    | mg/kg |                  | 4             | 5             | 9             | ----          | 6             |
| Zinc                                                             | 7440-66-6  | 5    | mg/kg |                  | 155           | 1210          | 83            | ----          | 217           |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                 |            |      |       |                  |               |               |               |               |               |
| Mercury                                                          | 7439-97-6  | 0.1  | mg/kg |                  | <0.1          | <0.1          | <0.1          | ----          | 0.2           |
| <b>EK026SF: Total CN by Segmented Flow Analyser</b>              |            |      |       |                  |               |               |               |               |               |
| Total Cyanide                                                    | 57-12-5    | 1    | mg/kg |                  | <1            | <1            | <1            | ----          | <1            |
| <b>EP066: Polychlorinated Biphenyls (PCB)</b>                    |            |      |       |                  |               |               |               |               |               |
| Total Polychlorinated biphenyls                                  | ----       | 0.1  | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| <b>EP068A: Organochlorine Pesticides (OC)</b>                    |            |      |       |                  |               |               |               |               |               |
| alpha-BHC                                                        | 319-84-6   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| Hexachlorobenzene (HCB)                                          | 118-74-1   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| beta-BHC                                                         | 319-85-7   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| gamma-BHC                                                        | 58-89-9    | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| delta-BHC                                                        | 319-86-8   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| Heptachlor                                                       | 76-44-8    | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| Aldrin                                                           | 309-00-2   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| Heptachlor epoxide                                               | 1024-57-3  | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| ^ Total Chlordane (sum)                                          | ----       | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| trans-Chlordane                                                  | 5103-74-2  | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| alpha-Endosulfan                                                 | 959-98-8   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| cis-Chlordane                                                    | 5103-71-9  | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| Dieldrin                                                         | 60-57-1    | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |



| Sub-Matrix: SOIL<br>(Matrix: SOIL)                 |                      |      |       | Client sample ID |  | BH-1A         |  | BH-2A         |  | TP-1A         |  | TP-1B         |  | TP-2A         |  |
|----------------------------------------------------|----------------------|------|-------|------------------|--|---------------|--|---------------|--|---------------|--|---------------|--|---------------|--|
| Client sampling date / time                        |                      |      |       | [30-Jun-2016]    |  | [30-Jun-2016] |  | [30-Jun-2016] |  | [30-Jun-2016] |  | [30-Jun-2016] |  | [30-Jun-2016] |  |
| Compound                                           | CAS Number           | LOR  | Unit  | ES1614401-001    |  | ES1614401-002 |  | ES1614401-003 |  | ES1614401-004 |  | ES1614401-005 |  |               |  |
|                                                    |                      |      |       | Result           |  | Result        |  | Result        |  | Result        |  | Result        |  |               |  |
| EP068A: Organochlorine Pesticides (OC) - Continued |                      |      |       |                  |  |               |  |               |  |               |  |               |  |               |  |
| 4,4'-DDE                                           | 72-55-9              | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| Endrin                                             | 72-20-8              | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| beta-Endosulfan                                    | 33213-65-9           | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| ^ Endosulfan (sum)                                 | 115-29-7             | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| 4,4'-DDD                                           | 72-54-8              | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| Endrin aldehyde                                    | 7421-93-4            | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| Endosulfan sulfate                                 | 1031-07-8            | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| 4,4'-DDT                                           | 50-29-3              | 0.2  | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| Endrin ketone                                      | 53494-70-5           | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| Methoxychlor                                       | 72-43-5              | 0.2  | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| ^ Sum of Aldrin + Dieldrin                         | 309-00-2/60-57-1     | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| ^ Sum of DDD + DDE + DDT                           | 72-54-8/72-55-9/50-2 | 0.05 | mg/kg | ----             |  | ----          |  | ----          |  | ----          |  | ----          |  |               |  |
| EP075(SIM)B: Polynuclear Aromatic Hydrocarbons     |                      |      |       |                  |  |               |  |               |  |               |  |               |  |               |  |
| Naphthalene                                        | 91-20-3              | 0.5  | mg/kg | <0.5             |  | <0.5          |  | <0.5          |  | <0.5          |  | <0.5          |  |               |  |
| Acenaphthylene                                     | 208-96-8             | 0.5  | mg/kg | <0.5             |  | <0.5          |  | <0.5          |  | <0.5          |  | <0.5          |  |               |  |
| Acenaphthene                                       | 83-32-9              | 0.5  | mg/kg | <0.5             |  | <0.5          |  | <0.5          |  | <0.5          |  | <0.5          |  |               |  |
| Fluorene                                           | 86-73-7              | 0.5  | mg/kg | <0.5             |  | <0.5          |  | <0.5          |  | <0.5          |  | <0.5          |  |               |  |
| Phenanthrene                                       | 85-01-8              | 0.5  | mg/kg | 0.5              |  | 0.6           |  | 0.6           |  | <0.5          |  | 1.6           |  |               |  |
| Anthracene                                         | 120-12-7             | 0.5  | mg/kg | <0.5             |  | <0.5          |  | <0.5          |  | <0.5          |  | <0.5          |  |               |  |
| Fluoranthene                                       | 206-44-0             | 0.5  | mg/kg | 1.1              |  | 1.2           |  | 1.2           |  | <0.5          |  | 2.8           |  |               |  |
| Pyrene                                             | 129-00-0             | 0.5  | mg/kg | 1.0              |  | 1.1           |  | 1.2           |  | <0.5          |  | 2.7           |  |               |  |
| Benzo(a)anthracene                                 | 56-55-3              | 0.5  | mg/kg | 0.7              |  | 0.8           |  | 0.6           |  | <0.5          |  | 1.5           |  |               |  |
| Chrysene                                           | 218-01-9             | 0.5  | mg/kg | 0.6              |  | 0.7           |  | 0.5           |  | <0.5          |  | 1.4           |  |               |  |
| Benzo(b+j)fluoranthene                             | 205-99-2 205-82-3    | 0.5  | mg/kg | 0.8              |  | 1.1           |  | 0.6           |  | <0.5          |  | 1.6           |  |               |  |
| Benzo(k)fluoranthene                               | 207-08-9             | 0.5  | mg/kg | <0.5             |  | <0.5          |  | <0.5          |  | <0.5          |  | 0.6           |  |               |  |
| Benzo(a)pyrene                                     | 50-32-8              | 0.5  | mg/kg | 0.7              |  | 0.9           |  | 0.5           |  | <0.5          |  | 1.3           |  |               |  |
| Indeno(1.2.3.cd)pyrene                             | 193-39-5             | 0.5  | mg/kg | <0.5             |  | 0.5           |  | <0.5          |  | <0.5          |  | 0.6           |  |               |  |
| Dibenz(a.h)anthracene                              | 53-70-3              | 0.5  | mg/kg | <0.5             |  | <0.5          |  | <0.5          |  | <0.5          |  | <0.5          |  |               |  |
| Benzo(g.h.i)perylene                               | 191-24-2             | 0.5  | mg/kg | <0.5             |  | 0.6           |  | <0.5          |  | <0.5          |  | 0.8           |  |               |  |
| ^ Sum of polycyclic aromatic hydrocarbons          | ----                 | 0.5  | mg/kg | 5.4              |  | 7.5           |  | 5.2           |  | <0.5          |  | 14.9          |  |               |  |
| ^ Benzo(a)pyrene TEQ (zero)                        | ----                 | 0.5  | mg/kg | 0.8              |  | 1.2           |  | 0.6           |  | <0.5          |  | 1.8           |  |               |  |
| ^ Benzo(a)pyrene TEQ (half LOR)                    | ----                 | 0.5  | mg/kg | 1.2              |  | 1.4           |  | 0.9           |  | 0.6           |  | 2.0           |  |               |  |
| ^ Benzo(a)pyrene TEQ (LOR)                         | ----                 | 0.5  | mg/kg | 1.5              |  | 1.7           |  | 1.2           |  | 1.2           |  | 2.2           |  |               |  |
| EP080/071: Total Petroleum Hydrocarbons            |                      |      |       |                  |  |               |  |               |  |               |  |               |  |               |  |





## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                                     |                   |      |       | Client sample ID | BH-1A         | BH-2A         | TP-1A         | TP-1B         | TP-2A         |
|------------------------------------------------------------------------|-------------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                                            |                   |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                                               | CAS Number        | LOR  | Unit  |                  | ES1614401-001 | ES1614401-002 | ES1614401-003 | ES1614401-004 | ES1614401-005 |
|                                                                        |                   |      |       |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EP080/071: Total Petroleum Hydrocarbons - Continued</b>             |                   |      |       |                  |               |               |               |               |               |
| 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          | ----          | 120           |
| C29 - C36 Fraction                                                     | ----              | 100  | mg/kg |                  | <100          | <100          | <100          | ----          | <100          |
| ^ C10 - C36 Fraction (sum)                                             | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | ----          | 120           |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |      |       |                  |               |               |               |               |               |
| 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                                                    | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | ----          | <50           |
| >C16 - C34 Fraction                                                    | ----              | 100  | mg/kg |                  | <100          | <100          | <100          | ----          | 180           |
| >C34 - C40 Fraction                                                    | ----              | 100  | mg/kg |                  | <100          | <100          | <100          | ----          | <100          |
| ^ >C10 - C40 Fraction (sum)                                            | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | ----          | 180           |
| ^ >C10 - C16 Fraction minus Naphthalene (F2)                           | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | ----          | <50           |
| <b>EP080: BTEXN</b>                                                    |                   |      |       |                  |               |               |               |               |               |
| Benzene                                                                | 71-43-2           | 0.2  | mg/kg |                  | <0.2          | <0.2          | <0.2          | ----          | <0.2          |
| Toluene                                                                | 108-88-3          | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | ----          | <0.5          |
| Ethylbenzene                                                           | 100-41-4          | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | ----          | <0.5          |
| meta- & para-Xylene                                                    | 108-38-3 106-42-3 | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | ----          | <0.5          |
| ortho-Xylene                                                           | 95-47-6           | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | ----          | <0.5          |
| ^ Sum of BTEX                                                          | ----              | 0.2  | mg/kg |                  | <0.2          | <0.2          | <0.2          | ----          | <0.2          |
| ^ Total Xylenes                                                        | 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            |
| <b>EP066S: PCB Surrogate</b>                                           |                   |      |       |                  |               |               |               |               |               |
| Decachlorobiphenyl                                                     | 2051-24-3         | 0.1  | %     |                  | ----          | ----          | ----          | ----          | ----          |
| <b>EP068S: Organochlorine Pesticide Surrogate</b>                      |                   |      |       |                  |               |               |               |               |               |
| Dibromo-DDE                                                            | 21655-73-2        | 0.05 | %     |                  | ----          | ----          | ----          | ----          | ----          |
| <b>EP068T: Organophosphorus Pesticide Surrogate</b>                    |                   |      |       |                  |               |               |               |               |               |
| DEF                                                                    | 78-48-8           | 0.05 | %     |                  | ----          | ----          | ----          | ----          | ----          |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>                       |                   |      |       |                  |               |               |               |               |               |
| Phenol-d6                                                              | 13127-88-3        | 0.5  | %     |                  | 96.8          | 95.4          | 78.4          | 79.3          | 90.2          |
| 2-Chlorophenol-D4                                                      | 93951-73-6        | 0.5  | %     |                  | 92.1          | 90.4          | 75.6          | 72.8          | 82.7          |
| 2,4,6-Tribromophenol                                                   | 118-79-6          | 0.5  | %     |                  | 97.5          | 103           | 69.2          | 63.9          | 89.8          |





## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)    |            |     |      | Client sample ID | BH-1A         | BH-2A         | TP-1A         | TP-1B         | TP-2A         |
|---------------------------------------|------------|-----|------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time           |            |     |      |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                              | CAS Number | LOR | Unit |                  | ES1614401-001 | ES1614401-002 | ES1614401-003 | ES1614401-004 | ES1614401-005 |
|                                       |            |     |      |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EP075(SIM)T: PAH Surrogates</b>    |            |     |      |                  |               |               |               |               |               |
| 2-Fluorobiphenyl                      | 321-60-8   | 0.5 | %    |                  | 86.2          | 83.2          | 86.4          | 75.0          | 82.3          |
| Anthracene-d10                        | 1719-06-8  | 0.5 | %    |                  | 103           | 104           | 100           | 91.3          | 99.6          |
| 4-Terphenyl-d14                       | 1718-51-0  | 0.5 | %    |                  | 95.1          | 98.3          | 95.3          | 90.6          | 95.0          |
| <b>EP080S: TPH(V)/BTEX Surrogates</b> |            |     |      |                  |               |               |               |               |               |
| 1,2-Dichloroethane-D4                 | 17060-07-0 | 0.2 | %    |                  | 96.6          | 112           | 111           | ----          | 109           |
| Toluene-D8                            | 2037-26-5  | 0.2 | %    |                  | 97.8          | 94.1          | 94.2          | ----          | 93.2          |
| 4-Bromofluorobenzene                  | 460-00-4   | 0.2 | %    |                  | 93.7          | 87.6          | 81.1          | ----          | 83.6          |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                               |            |      |       | Client sample ID | TP-2B         | TP-3A         | TP-4A         | TP-5A         | TP-5B         |
|------------------------------------------------------------------|------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                                      |            |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                                         | CAS Number | LOR  | Unit  |                  | ES1614401-006 | ES1614401-007 | ES1614401-008 | ES1614401-010 | ES1614401-011 |
|                                                                  |            |      |       |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EA055: Moisture Content</b>                                   |            |      |       |                  |               |               |               |               |               |
| Moisture Content (dried @ 103°C)                                 | ----       | 1    | %     |                  | 11.8          | 27.4          | 23.8          | 36.2          | 27.1          |
| <b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b> |            |      |       |                  |               |               |               |               |               |
| Asbestos Detected                                                | 1332-21-4  | 0.1  | g/kg  |                  | ----          | No            | No            | No            | ----          |
| Asbestos Type                                                    | 1332-21-4  | -    | --    |                  | ----          | -             | -             | -             | ----          |
| Sample weight (dry)                                              | ----       | 0.01 | g     |                  | ----          | 267           | 319           | 129           | ----          |
| APPROVED IDENTIFIER:                                             | ----       | -    | --    |                  | ----          | S.SPOONER     | C.OWLER       | C.OWLER       | ----          |
| <b>EG005T: Total Metals by ICP-AES</b>                           |            |      |       |                  |               |               |               |               |               |
| Arsenic                                                          | 7440-38-2  | 5    | mg/kg |                  | ----          | <5            | <5            | <5            | ----          |
| Cadmium                                                          | 7440-43-9  | 1    | mg/kg |                  | ----          | <1            | <1            | <1            | ----          |
| Chromium                                                         | 7440-47-3  | 2    | mg/kg |                  | ----          | 11            | 19            | 8             | ----          |
| Copper                                                           | 7440-50-8  | 5    | mg/kg |                  | ----          | 62            | 54            | 81            | ----          |
| Lead                                                             | 7439-92-1  | 5    | mg/kg |                  | ----          | 50            | 68            | 64            | ----          |
| Nickel                                                           | 7440-02-0  | 2    | mg/kg |                  | ----          | 5             | 4             | 5             | ----          |
| Zinc                                                             | 7440-66-6  | 5    | mg/kg |                  | ----          | 186           | 414           | 249           | ----          |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                 |            |      |       |                  |               |               |               |               |               |
| Mercury                                                          | 7439-97-6  | 0.1  | mg/kg |                  | ----          | <0.1          | <0.1          | 0.2           | ----          |
| <b>EK026SF: Total CN by Segmented Flow Analyser</b>              |            |      |       |                  |               |               |               |               |               |
| Total Cyanide                                                    | 57-12-5    | 1    | mg/kg |                  | ----          | ----          | <1            | 2             | ----          |
| <b>EP066: Polychlorinated Biphenyls (PCB)</b>                    |            |      |       |                  |               |               |               |               |               |
| Total Polychlorinated biphenyls                                  | ----       | 0.1  | mg/kg |                  | ----          | <0.1          | ----          | ----          | ----          |
| <b>EP068A: Organochlorine Pesticides (OC)</b>                    |            |      |       |                  |               |               |               |               |               |
| 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         | ----          | ----          | ----          |
| 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         | ----          | ----          | ----          |



| Sub-Matrix: SOIL<br>(Matrix: SOIL)                 |                      |      |       | Client sample ID |               | TP-2B         | TP-3A         | TP-4A         | TP-5A         | TP-5B |
|----------------------------------------------------|----------------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|-------|
| Client sampling date / time                        |                      |      |       | [30-Jun-2016]    | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |       |
| Compound                                           | CAS Number           | LOR  | Unit  | ES1614401-006    | ES1614401-007 | ES1614401-008 | ES1614401-010 | ES1614401-011 |               |       |
|                                                    |                      |      |       | Result           | Result        | Result        | Result        | Result        |               |       |
| EP068A: Organochlorine Pesticides (OC) - Continued |                      |      |       |                  |               |               |               |               |               |       |
| 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                           | 72-54-8/72-55-9/50-2 | 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 | ----             | 0.7           | <0.5          | 1.0           | ----          |               |       |
| Anthracene                                         | 120-12-7             | 0.5  | mg/kg | ----             | <0.5          | <0.5          | <0.5          | ----          |               |       |
| Fluoranthene                                       | 206-44-0             | 0.5  | mg/kg | ----             | 1.2           | <0.5          | 1.8           | ----          |               |       |
| Pyrene                                             | 129-00-0             | 0.5  | mg/kg | ----             | 1.1           | <0.5          | 1.8           | ----          |               |       |
| Benz(a)anthracene                                  | 56-55-3              | 0.5  | mg/kg | ----             | 0.6           | <0.5          | 1.1           | ----          |               |       |
| Chrysene                                           | 218-01-9             | 0.5  | mg/kg | ----             | <0.5          | <0.5          | 1.0           | ----          |               |       |
| Benzo(b+j)fluoranthene                             | 205-99-2 205-82-3    | 0.5  | mg/kg | ----             | <0.5          | <0.5          | 1.2           | ----          |               |       |
| 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          | 1.0           | ----          |               |       |
| 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          | 0.6           | ----          |               |       |
| ^ Sum of polycyclic aromatic hydrocarbons          | ----                 | 0.5  | mg/kg | ----             | 3.6           | <0.5          | 9.5           | ----          |               |       |
| ^ Benzo(a)pyrene TEQ (zero)                        | ----                 | 0.5  | mg/kg | ----             | <0.5          | <0.5          | 1.2           | ----          |               |       |
| ^ Benzo(a)pyrene TEQ (half LOR)                    | ----                 | 0.5  | mg/kg | ----             | 0.6           | 0.6           | 1.5           | ----          |               |       |
| ^ Benzo(a)pyrene TEQ (LOR)                         | ----                 | 0.5  | mg/kg | ----             | 1.2           | 1.2           | 1.8           | ----          |               |       |
| EP080/071: Total Petroleum Hydrocarbons            |                      |      |       |                  |               |               |               |               |               |       |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                                     |                   |      |       | Client sample ID | TP-2B         | TP-3A         | TP-4A         | TP-5A         | TP-5B         |
|------------------------------------------------------------------------|-------------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                                            |                   |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                                               | CAS Number        | LOR  | Unit  |                  | ES1614401-006 | ES1614401-007 | ES1614401-008 | ES1614401-010 | ES1614401-011 |
|                                                                        |                   |      |       |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EP080/071: Total Petroleum Hydrocarbons - Continued</b>             |                   |      |       |                  |               |               |               |               |               |
| C6 - C9 Fraction                                                       | ----              | 10   | mg/kg |                  | <10           | <10           | <10           | <10           | <10           |
| C10 - C14 Fraction                                                     | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | <50           | <50           |
| C15 - C28 Fraction                                                     | ----              | 100  | mg/kg |                  | <100          | <100          | <100          | 100           | <100          |
| C29 - C36 Fraction                                                     | ----              | 100  | mg/kg |                  | <100          | <100          | <100          | 120           | <100          |
| ^ C10 - C36 Fraction (sum)                                             | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | 220           | <50           |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |      |       |                  |               |               |               |               |               |
| C6 - C10 Fraction                                                      | C6_C10            | 10   | mg/kg |                  | <10           | <10           | <10           | <10           | <10           |
| ^ C6 - C10 Fraction minus BTEX (F1)                                    | C6_C10-BTEX       | 10   | mg/kg |                  | <10           | <10           | <10           | <10           | <10           |
| >C10 - C16 Fraction                                                    | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | <50           | <50           |
| >C16 - C34 Fraction                                                    | ----              | 100  | mg/kg |                  | 110           | <100          | <100          | 170           | <100          |
| >C34 - C40 Fraction                                                    | ----              | 100  | mg/kg |                  | <100          | <100          | <100          | 100           | <100          |
| ^ >C10 - C40 Fraction (sum)                                            | ----              | 50   | mg/kg |                  | 110           | <50           | <50           | 270           | <50           |
| ^ >C10 - C16 Fraction minus Naphthalene (F2)                           | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | <50           | <50           |
| <b>EP080: BTEXN</b>                                                    |                   |      |       |                  |               |               |               |               |               |
| Benzene                                                                | 71-43-2           | 0.2  | mg/kg |                  | <0.2          | <0.2          | <0.2          | <0.2          | <0.2          |
| Toluene                                                                | 108-88-3          | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Ethylbenzene                                                           | 100-41-4          | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| meta- & para-Xylene                                                    | 108-38-3 106-42-3 | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| ortho-Xylene                                                           | 95-47-6           | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| ^ Sum of BTEX                                                          | ----              | 0.2  | mg/kg |                  | <0.2          | <0.2          | <0.2          | <0.2          | <0.2          |
| ^ Total Xylenes                                                        | 1330-20-7         | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | <0.5          |
| Naphthalene                                                            | 91-20-3           | 1    | mg/kg |                  | <1            | <1            | <1            | <1            | <1            |
| <b>EP066S: PCB Surrogate</b>                                           |                   |      |       |                  |               |               |               |               |               |
| Decachlorobiphenyl                                                     | 2051-24-3         | 0.1  | %     |                  | ----          | 85.5          | ----          | ----          | ----          |
| <b>EP068S: Organochlorine Pesticide Surrogate</b>                      |                   |      |       |                  |               |               |               |               |               |
| Dibromo-DDE                                                            | 21655-73-2        | 0.05 | %     |                  | ----          | 104           | ----          | ----          | ----          |
| <b>EP068T: Organophosphorus Pesticide Surrogate</b>                    |                   |      |       |                  |               |               |               |               |               |
| DEF                                                                    | 78-48-8           | 0.05 | %     |                  | ----          | 76.3          | ----          | ----          | ----          |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>                       |                   |      |       |                  |               |               |               |               |               |
| Phenol-d6                                                              | 13127-88-3        | 0.5  | %     |                  | ----          | 88.2          | 96.4          | 95.9          | ----          |
| 2-Chlorophenol-D4                                                      | 93951-73-6        | 0.5  | %     |                  | ----          | 82.5          | 89.5          | 91.6          | ----          |
| 2,4,6-Tribromophenol                                                   | 118-79-6          | 0.5  | %     |                  | ----          | 77.5          | 101           | 100           | ----          |





## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)    |            |     |      | Client sample ID | TP-2B         | TP-3A         | TP-4A         | TP-5A         | TP-5B         |
|---------------------------------------|------------|-----|------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time           |            |     |      |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                              | CAS Number | LOR | Unit |                  | ES1614401-006 | ES1614401-007 | ES1614401-008 | ES1614401-010 | ES1614401-011 |
|                                       |            |     |      |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EP075(SIM)T: PAH Surrogates</b>    |            |     |      |                  |               |               |               |               |               |
| 2-Fluorobiphenyl                      | 321-60-8   | 0.5 | %    |                  | ----          | 82.6          | 83.6          | 84.4          | ----          |
| Anthracene-d10                        | 1719-06-8  | 0.5 | %    |                  | ----          | 99.6          | 105           | 103           | ----          |
| 4-Terphenyl-d14                       | 1718-51-0  | 0.5 | %    |                  | ----          | 92.7          | 97.4          | 96.0          | ----          |
| <b>EP080S: TPH(V)/BTEX Surrogates</b> |            |     |      |                  |               |               |               |               |               |
| 1,2-Dichloroethane-D4                 | 17060-07-0 | 0.2 | %    |                  | 121           | 111           | 119           | 97.4          | 118           |
| Toluene-D8                            | 2037-26-5  | 0.2 | %    |                  | 98.0          | 92.3          | 95.3          | 82.4          | 98.6          |
| 4-Bromofluorobenzene                  | 460-00-4   | 0.2 | %    |                  | 85.6          | 75.3          | 87.6          | 71.9          | 88.6          |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                               |            |      |       | Client sample ID | TP-6A         | TP-7A         | TP-8A         | TP-8B         | TP-9A         |
|------------------------------------------------------------------|------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                                      |            |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                                         | CAS Number | LOR  | Unit  |                  | ES1614401-012 | ES1614401-013 | ES1614401-014 | ES1614401-015 | ES1614401-016 |
|                                                                  |            |      |       |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EA055: Moisture Content</b>                                   |            |      |       |                  |               |               |               |               |               |
| Moisture Content (dried @ 103°C)                                 | ----       | 1    | %     |                  | 25.7          | 22.5          | 28.8          | 34.4          | 24.3          |
| <b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b> |            |      |       |                  |               |               |               |               |               |
| Asbestos Detected                                                | 1332-21-4  | 0.1  | g/kg  |                  | No            | No            | No            | ----          | No            |
| Asbestos Type                                                    | 1332-21-4  | -    | --    |                  | -             | -             | -             | ----          | -             |
| Sample weight (dry)                                              | ----       | 0.01 | g     |                  | 192           | 197           | 158           | ----          | 234           |
| APPROVED IDENTIFIER:                                             | ----       | -    | --    |                  | S.SPOONER     | S.SPOONER     | S.SPOONER     | ----          | S.SPOONER     |
| <b>EG005T: Total Metals by ICP-AES</b>                           |            |      |       |                  |               |               |               |               |               |
| Arsenic                                                          | 7440-38-2  | 5    | mg/kg |                  | 7             | ----          | <5            | ----          | ----          |
| Cadmium                                                          | 7440-43-9  | 1    | mg/kg |                  | <1            | ----          | <1            | ----          | ----          |
| Chromium                                                         | 7440-47-3  | 2    | mg/kg |                  | 13            | ----          | 10            | ----          | ----          |
| Copper                                                           | 7440-50-8  | 5    | mg/kg |                  | 61            | ----          | 60            | ----          | ----          |
| Lead                                                             | 7439-92-1  | 5    | mg/kg |                  | 403           | ----          | 82            | ----          | ----          |
| Nickel                                                           | 7440-02-0  | 2    | mg/kg |                  | 7             | ----          | 6             | ----          | ----          |
| Zinc                                                             | 7440-66-6  | 5    | mg/kg |                  | 374           | ----          | 269           | ----          | ----          |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                 |            |      |       |                  |               |               |               |               |               |
| Mercury                                                          | 7439-97-6  | 0.1  | mg/kg |                  | 0.6           | ----          | 0.1           | ----          | ----          |
| <b>EK026SF: Total CN by Segmented Flow Analyser</b>              |            |      |       |                  |               |               |               |               |               |
| Total Cyanide                                                    | 57-12-5    | 1    | mg/kg |                  | ----          | ----          | ----          | ----          | ----          |
| <b>EP066: Polychlorinated Biphenyls (PCB)</b>                    |            |      |       |                  |               |               |               |               |               |
| Total Polychlorinated biphenyls                                  | ----       | 0.1  | mg/kg |                  | <0.1          | ----          | <0.1          | ----          | ----          |
| <b>EP068A: Organochlorine Pesticides (OC)</b>                    |            |      |       |                  |               |               |               |               |               |
| 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         | ----          | ----          |
| 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         | ----          | ----          |



| Sub-Matrix: SOIL<br>(Matrix: SOIL)                 |                      |      |       | Client sample ID | TP-6A         | TP-7A         | TP-8A         | TP-8B         | TP-9A         |
|----------------------------------------------------|----------------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                        |                      |      |       | [30-Jun-2016]    | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                           | CAS Number           | LOR  | Unit  | ES1614401-012    | ES1614401-013 | ES1614401-014 | ES1614401-015 | ES1614401-016 |               |
|                                                    |                      |      |       | Result           | Result        | Result        | Result        | Result        |               |
| EP068A: Organochlorine Pesticides (OC) - Continued |                      |      |       |                  |               |               |               |               |               |
| 4.4'-DDE                                           | 72-55-9              | 0.05 | mg/kg | <0.05            | ----          | <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 | <0.05            | ----          | <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 | <0.2             | ----          | <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                           | 72-54-8/72-55-9/50-2 | 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          | ----          | <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 | 0.6              | 0.7           | 0.7           | ----          | 0.6           |               |
| Pyrene                                             | 129-00-0             | 0.5  | mg/kg | 0.6              | 0.7           | 0.6           | ----          | 0.6           |               |
| Benz(a)anthracene                                  | 56-55-3              | 0.5  | mg/kg | <0.5             | 0.5           | <0.5          | ----          | <0.5          |               |
| Chrysene                                           | 218-01-9             | 0.5  | mg/kg | <0.5             | <0.5          | <0.5          | ----          | <0.5          |               |
| Benzo(b+j)fluoranthene                             | 205-99-2 205-82-3    | 0.5  | mg/kg | 0.6              | 0.7           | <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             | 0.6           | <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 | 1.8              | 3.2           | 1.3           | ----          | 1.2           |               |
| ^ Benzo(a)pyrene TEQ (zero)                        | ----                 | 0.5  | mg/kg | <0.5             | 0.7           | <0.5          | ----          | <0.5          |               |
| ^ Benzo(a)pyrene TEQ (half LOR)                    | ----                 | 0.5  | mg/kg | 0.6              | 1.0           | 0.6           | ----          | 0.6           |               |
| ^ Benzo(a)pyrene TEQ (LOR)                         | ----                 | 0.5  | mg/kg | 1.2              | 1.3           | 1.2           | ----          | 1.2           |               |
| EP080/071: Total Petroleum Hydrocarbons            |                      |      |       |                  |               |               |               |               |               |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                                     |                   |      |       | Client sample ID | TP-6A         | TP-7A         | TP-8A         | TP-8B         | TP-9A         |
|------------------------------------------------------------------------|-------------------|------|-------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                                            |                   |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                                               | CAS Number        | LOR  | Unit  |                  | ES1614401-012 | ES1614401-013 | ES1614401-014 | ES1614401-015 | ES1614401-016 |
|                                                                        |                   |      |       |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EP080/071: Total Petroleum Hydrocarbons - Continued</b>             |                   |      |       |                  |               |               |               |               |               |
| C6 - C9 Fraction                                                       | ----              | 10   | mg/kg |                  | <10           | ----          | <10           | <10           | ----          |
| C10 - C14 Fraction                                                     | ----              | 50   | mg/kg |                  | <50           | ----          | <50           | <50           | ----          |
| C15 - C28 Fraction                                                     | ----              | 100  | mg/kg |                  | <100          | ----          | <100          | <100          | ----          |
| C29 - C36 Fraction                                                     | ----              | 100  | mg/kg |                  | <100          | ----          | <100          | <100          | ----          |
| ^ C10 - C36 Fraction (sum)                                             | ----              | 50   | mg/kg |                  | <50           | ----          | <50           | <50           | ----          |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |      |       |                  |               |               |               |               |               |
| C6 - C10 Fraction                                                      | C6_C10            | 10   | mg/kg |                  | <10           | ----          | <10           | <10           | ----          |
| ^ C6 - C10 Fraction minus BTEX (F1)                                    | C6_C10-BTEX       | 10   | mg/kg |                  | <10           | ----          | <10           | <10           | ----          |
| >C10 - C16 Fraction                                                    | ----              | 50   | mg/kg |                  | <50           | ----          | <50           | <50           | ----          |
| >C16 - C34 Fraction                                                    | ----              | 100  | mg/kg |                  | <100          | ----          | <100          | <100          | ----          |
| >C34 - C40 Fraction                                                    | ----              | 100  | mg/kg |                  | <100          | ----          | <100          | <100          | ----          |
| ^ >C10 - C40 Fraction (sum)                                            | ----              | 50   | mg/kg |                  | <50           | ----          | <50           | <50           | ----          |
| ^ >C10 - C16 Fraction minus Naphthalene (F2)                           | ----              | 50   | mg/kg |                  | <50           | ----          | <50           | <50           | ----          |
| <b>EP080: BTEXN</b>                                                    |                   |      |       |                  |               |               |               |               |               |
| 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            | ----          |
| <b>EP066S: PCB Surrogate</b>                                           |                   |      |       |                  |               |               |               |               |               |
| Decachlorobiphenyl                                                     | 2051-24-3         | 0.1  | %     |                  | 74.1          | ----          | 70.5          | ----          | ----          |
| <b>EP068S: Organochlorine Pesticide Surrogate</b>                      |                   |      |       |                  |               |               |               |               |               |
| Dibromo-DDE                                                            | 21655-73-2        | 0.05 | %     |                  | 87.0          | ----          | 96.6          | ----          | ----          |
| <b>EP068T: Organophosphorus Pesticide Surrogate</b>                    |                   |      |       |                  |               |               |               |               |               |
| DEF                                                                    | 78-48-8           | 0.05 | %     |                  | 62.8          | ----          | 70.0          | ----          | ----          |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>                       |                   |      |       |                  |               |               |               |               |               |
| Phenol-d6                                                              | 13127-88-3        | 0.5  | %     |                  | 90.6          | 96.3          | 97.0          | ----          | 93.5          |
| 2-Chlorophenol-D4                                                      | 93951-73-6        | 0.5  | %     |                  | 86.1          | 89.4          | 91.8          | ----          | 85.4          |
| 2,4,6-Tribromophenol                                                   | 118-79-6          | 0.5  | %     |                  | 96.9          | 101           | 105           | ----          | 93.8          |





## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)    |            |     |      | Client sample ID | TP-6A         | TP-7A         | TP-8A         | TP-8B         | TP-9A         |
|---------------------------------------|------------|-----|------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time           |            |     |      |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                              | CAS Number | LOR | Unit |                  | ES1614401-012 | ES1614401-013 | ES1614401-014 | ES1614401-015 | ES1614401-016 |
|                                       |            |     |      |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EP075(SIM)T: PAH Surrogates</b>    |            |     |      |                  |               |               |               |               |               |
| 2-Fluorobiphenyl                      | 321-60-8   | 0.5 | %    |                  | 80.9          | 83.7          | 84.9          | ----          | 80.6          |
| Anthracene-d10                        | 1719-06-8  | 0.5 | %    |                  | 99.7          | 106           | 102           | ----          | 100           |
| 4-Terphenyl-d14                       | 1718-51-0  | 0.5 | %    |                  | 92.1          | 97.0          | 97.1          | ----          | 93.7          |
| <b>EP080S: TPH(V)/BTEX Surrogates</b> |            |     |      |                  |               |               |               |               |               |
| 1,2-Dichloroethane-D4                 | 17060-07-0 | 0.2 | %    |                  | 108           | ----          | 104           | 101           | ----          |
| Toluene-D8                            | 2037-26-5  | 0.2 | %    |                  | 91.7          | ----          | 84.2          | 100           | ----          |
| 4-Bromofluorobenzene                  | 460-00-4   | 0.2 | %    |                  | 83.1          | ----          | 76.6          | 96.5          | ----          |



## Analytical Results

|                                                                  |            |      |       |                  |               |               |               |               |       |
|------------------------------------------------------------------|------------|------|-------|------------------|---------------|---------------|---------------|---------------|-------|
| Sub-Matrix: SOIL<br>(Matrix: SOIL)                               |            |      |       | Client sample ID | TP-10A        | DUP-01        | SHED C-1      | HOUSE C-1     | ----  |
| Client sampling date / time                                      |            |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | ----  |
| Compound                                                         | CAS Number | LOR  | Unit  |                  | ES1614401-017 | ES1614401-019 | ES1614401-020 | ES1614401-021 | ----- |
|                                                                  |            |      |       |                  | Result        | Result        | Result        | Result        | ----  |
| <b>EA055: Moisture Content</b>                                   |            |      |       |                  |               |               |               |               |       |
| Moisture Content (dried @ 103°C)                                 | ----       | 1    | %     |                  | 25.8          | 22.2          | 47.7          | 28.5          | ----  |
| <b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b> |            |      |       |                  |               |               |               |               |       |
| Asbestos Detected                                                | 1332-21-4  | 0.1  | g/kg  |                  | No            | No            | No            | No            | ----  |
| Asbestos Type                                                    | 1332-21-4  | -    | --    |                  | -             | -             | -             | -             | ----  |
| Sample weight (dry)                                              | ----       | 0.01 | g     |                  | 182           | 246           | 92.5          | 213           | ----  |
| APPROVED IDENTIFIER:                                             | ----       | -    | --    |                  | S.SPOONER     | S.SPOONER     | C.OWLER       | C.OWLER       | ----  |
| <b>EG005T: Total Metals by ICP-AES</b>                           |            |      |       |                  |               |               |               |               |       |
| Arsenic                                                          | 7440-38-2  | 5    | mg/kg |                  | 11            | <5            | <5            | 6             | ----  |
| Cadmium                                                          | 7440-43-9  | 1    | mg/kg |                  | <1            | 1             | 6             | <1            | ----  |
| Chromium                                                         | 7440-47-3  | 2    | mg/kg |                  | 17            | 14            | 110           | 25            | ----  |
| Copper                                                           | 7440-50-8  | 5    | mg/kg |                  | 87            | 55            | 277           | 95            | ----  |
| Lead                                                             | 7439-92-1  | 5    | mg/kg |                  | 240           | 94            | 288           | 370           | ----  |
| Nickel                                                           | 7440-02-0  | 2    | mg/kg |                  | 10            | 4             | 21            | 10            | ----  |
| Zinc                                                             | 7440-66-6  | 5    | mg/kg |                  | 844           | 906           | 6590          | 1840          | ----  |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                 |            |      |       |                  |               |               |               |               |       |
| Mercury                                                          | 7439-97-6  | 0.1  | mg/kg |                  | 0.1           | 0.1           | 0.2           | 0.1           | ----  |
| <b>EK026SF: Total CN by Segmented Flow Analyser</b>              |            |      |       |                  |               |               |               |               |       |
| Total Cyanide                                                    | 57-12-5    | 1    | mg/kg |                  | 2             | <1            | ----          | ----          | ----  |
| <b>EP066: Polychlorinated Biphenyls (PCB)</b>                    |            |      |       |                  |               |               |               |               |       |
| Total Polychlorinated biphenyls                                  | ----       | 0.1  | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| <b>EP068A: Organochlorine Pesticides (OC)</b>                    |            |      |       |                  |               |               |               |               |       |
| alpha-BHC                                                        | 319-84-6   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| Hexachlorobenzene (HCB)                                          | 118-74-1   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| beta-BHC                                                         | 319-85-7   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| gamma-BHC                                                        | 58-89-9    | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| delta-BHC                                                        | 319-86-8   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| Heptachlor                                                       | 76-44-8    | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| Aldrin                                                           | 309-00-2   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| Heptachlor epoxide                                               | 1024-57-3  | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| ^ Total Chlordane (sum)                                          | ----       | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| trans-Chlordane                                                  | 5103-74-2  | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| alpha-Endosulfan                                                 | 959-98-8   | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| cis-Chlordane                                                    | 5103-71-9  | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |
| Dieldrin                                                         | 60-57-1    | 0.05 | mg/kg |                  | ----          | ----          | ----          | ----          | ----  |



| Sub-Matrix: SOIL<br>(Matrix: SOIL)                 |                      |          |       | Client sample ID | TP-10A        | DUP-01        | SHED C-1      | HOUSE C-1     | ---- |      |
|----------------------------------------------------|----------------------|----------|-------|------------------|---------------|---------------|---------------|---------------|------|------|
| Client sampling date / time                        |                      |          |       | [30-Jun-2016]    | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | ---- |      |
| Compound                                           | CAS Number           | LOR      | Unit  | ES1614401-017    | ES1614401-019 | ES1614401-020 | ES1614401-021 | -----         |      |      |
|                                                    |                      |          |       | Result           | Result        | Result        | Result        | Result        | ---- |      |
| EP068A: Organochlorine Pesticides (OC) - Continued |                      |          |       |                  |               |               |               |               |      |      |
| 4,4'-DDE                                           | 72-55-9              | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| Endrin                                             | 72-20-8              | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| beta-Endosulfan                                    | 33213-65-9           | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| ^ Endosulfan (sum)                                 | 115-29-7             | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| 4,4'-DDD                                           | 72-54-8              | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| Endrin aldehyde                                    | 7421-93-4            | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| Endosulfan sulfate                                 | 1031-07-8            | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| 4,4'-DDT                                           | 50-29-3              | 0.2      | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| Endrin ketone                                      | 53494-70-5           | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| Methoxychlor                                       | 72-43-5              | 0.2      | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| ^ Sum of Aldrin + Dieldrin                         | 309-00-2/60-57-1     | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| ^ Sum of DDD + DDE + DDT                           | 72-54-8/72-55-9/50-2 | 0.05     | mg/kg | ----             | ----          | ----          | ----          | ----          | ---- |      |
| 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 | 0.8              | <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 | 1.6              | <0.5          | 0.9           | 0.8           | ----          | ---- |      |
| Pyrene                                             | 129-00-0             | 0.5      | mg/kg | 1.5              | <0.5          | 0.9           | 0.8           | ----          | ---- |      |
| Benz(a)anthracene                                  | 56-55-3              | 0.5      | mg/kg | 1.0              | <0.5          | 0.5           | 0.5           | ----          | ---- |      |
| Chrysene                                           | 218-01-9             | 0.5      | mg/kg | 0.9              | <0.5          | <0.5          | <0.5          | ----          | ---- |      |
| Benzo(b+j)fluoranthene                             | 205-99-2             | 205-82-3 | 0.5   | mg/kg            | 1.4           | <0.5          | 0.6           | 0.6           | ---- | ---- |
| 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 | 1.1              | <0.5          | 0.5           | 0.5           | ----          | ---- |      |
| Indeno(1.2.3.cd)pyrene                             | 193-39-5             | 0.5      | mg/kg | 0.6              | <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 | 0.8              | <0.5          | <0.5          | <0.5          | ----          | ---- |      |
| ^ Sum of polycyclic aromatic hydrocarbons          | ----                 | 0.5      | mg/kg | 10.2             | <0.5          | 3.4           | 3.2           | ----          | ---- |      |
| ^ Benzo(a)pyrene TEQ (zero)                        | ----                 | 0.5      | mg/kg | 1.5              | <0.5          | 0.6           | 0.6           | ----          | ---- |      |
| ^ Benzo(a)pyrene TEQ (half LOR)                    | ----                 | 0.5      | mg/kg | 1.7              | 0.6           | 0.9           | 0.9           | ----          | ---- |      |
| ^ Benzo(a)pyrene TEQ (LOR)                         | ----                 | 0.5      | mg/kg | 2.0              | 1.2           | 1.2           |               |               |      |      |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                                     |                   |      |       | Client sample ID | TP-10A        | DUP-01        | SHED C-1      | HOUSE C-1     | ----  |
|------------------------------------------------------------------------|-------------------|------|-------|------------------|---------------|---------------|---------------|---------------|-------|
| Client sampling date / time                                            |                   |      |       |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | ----  |
| Compound                                                               | CAS Number        | LOR  | Unit  |                  | ES1614401-017 | ES1614401-019 | ES1614401-020 | ES1614401-021 | ----- |
|                                                                        |                   |      |       |                  | Result        | Result        | Result        | Result        | ----  |
| <b>EP080/071: Total Petroleum Hydrocarbons - Continued</b>             |                   |      |       |                  |               |               |               |               |       |
| 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          | 240           | 130           | ----  |
| C29 - C36 Fraction                                                     | ----              | 100  | mg/kg |                  | <100          | <100          | 260           | 160           | ----  |
| ^ C10 - C36 Fraction (sum)                                             | ----              | 50   | mg/kg |                  | <50           | <50           | 500           | 290           | ----  |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |      |       |                  |               |               |               |               |       |
| 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                                                    | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | <50           | ----  |
| >C16 - C34 Fraction                                                    | ----              | 100  | mg/kg |                  | 100           | <100          | 370           | 230           | ----  |
| >C34 - C40 Fraction                                                    | ----              | 100  | mg/kg |                  | <100          | <100          | 280           | 160           | ----  |
| ^ >C10 - C40 Fraction (sum)                                            | ----              | 50   | mg/kg |                  | 100           | <50           | 650           | 390           | ----  |
| ^ >C10 - C16 Fraction minus Naphthalene (F2)                           | ----              | 50   | mg/kg |                  | <50           | <50           | <50           | <50           | ----  |
| <b>EP080: BTEXN</b>                                                    |                   |      |       |                  |               |               |               |               |       |
| Benzene                                                                | 71-43-2           | 0.2  | mg/kg |                  | <0.2          | <0.2          | <0.2          | <0.2          | ----  |
| Toluene                                                                | 108-88-3          | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | ----  |
| Ethylbenzene                                                           | 100-41-4          | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | ----  |
| meta- & para-Xylene                                                    | 108-38-3 106-42-3 | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | ----  |
| ortho-Xylene                                                           | 95-47-6           | 0.5  | mg/kg |                  | <0.5          | <0.5          | <0.5          | <0.5          | ----  |
| ^ Sum of BTEX                                                          | ----              | 0.2  | mg/kg |                  | <0.2          | <0.2          | <0.2          | <0.2          | ----  |
| ^ Total Xylenes                                                        | 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            | ----  |
| <b>EP066S: PCB Surrogate</b>                                           |                   |      |       |                  |               |               |               |               |       |
| Decachlorobiphenyl                                                     | 2051-24-3         | 0.1  | %     |                  | ----          | ----          | ----          | ----          | ----  |
| <b>EP068S: Organochlorine Pesticide Surrogate</b>                      |                   |      |       |                  |               |               |               |               |       |
| Dibromo-DDE                                                            | 21655-73-2        | 0.05 | %     |                  | ----          | ----          | ----          | ----          | ----  |
| <b>EP068T: Organophosphorus Pesticide Surrogate</b>                    |                   |      |       |                  |               |               |               |               |       |
| DEF                                                                    | 78-48-8           | 0.05 | %     |                  | ----          | ----          | ----          | ----          | ----  |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>                       |                   |      |       |                  |               |               |               |               |       |
| Phenol-d6                                                              | 13127-88-3        | 0.5  | %     |                  | 92.2          | 94.7          | 87.8          | 87.3          | ----  |
| 2-Chlorophenol-D4                                                      | 93951-73-6        | 0.5  | %     |                  | 86.7          | 88.9          | 82.1          | 81.0          | ----  |
| 2,4,6-Tribromophenol                                                   | 118-79-6          | 0.5  | %     |                  | 93.7          | 95.8          | 86.4          | 83.2          | ----  |





## Analytical Results

|                                                   |            |     |      |                  |               |               |               |               |       |
|---------------------------------------------------|------------|-----|------|------------------|---------------|---------------|---------------|---------------|-------|
| Sub-Matrix: <b>SOIL</b><br>(Matrix: <b>SOIL</b> ) |            |     |      | Client sample ID | TP-10A        | DUP-01        | SHED C-1      | HOUSE C-1     | ----  |
| Client sampling date / time                       |            |     |      |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | ----  |
| Compound                                          | CAS Number | LOR | Unit |                  | ES1614401-017 | ES1614401-019 | ES1614401-020 | ES1614401-021 | ----- |
|                                                   |            |     |      |                  | Result        | Result        | Result        | Result        | ----  |
| <b>EP075(SIM)T: PAH Surrogates</b>                |            |     |      |                  |               |               |               |               |       |
| 2-Fluorobiphenyl                                  | 321-60-8   | 0.5 | %    |                  | 80.8          | 83.7          | 81.1          | 79.0          | ----  |
| Anthracene-d10                                    | 1719-06-8  | 0.5 | %    |                  | 101           | 101           | 92.9          | 89.8          | ----  |
| 4-Terphenyl-d14                                   | 1718-51-0  | 0.5 | %    |                  | 93.5          | 95.7          | 80.4          | 79.0          | ----  |
| <b>EP080S: TPH(V)/BTEX Surrogates</b>             |            |     |      |                  |               |               |               |               |       |
| 1,2-Dichloroethane-D4                             | 17060-07-0 | 0.2 | %    |                  | 116           | 116           | 90.9          | 96.2          | ----  |
| Toluene-D8                                        | 2037-26-5  | 0.2 | %    |                  | 95.6          | 100           | 102           | 84.5          | ----  |
| 4-Bromofluorobenzene                              | 460-00-4   | 0.2 | %    |                  | 84.3          | 88.1          | 86.9          | 75.2          | ----  |

## Analytical Results

### Descriptive Results

|                                                                  |                                                |
|------------------------------------------------------------------|------------------------------------------------|
| Sub-Matrix: <b>SOIL</b>                                          |                                                |
| Method: Compound                                                 | Client sample ID - Client sampling date / time |
| Analytical Results                                               |                                                |
| <b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b> |                                                |
| EA200: Description                                               | BH-1A - [30-Jun-2016]                          |
| EA200: Description                                               | BH-2A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-1A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-1B - [30-Jun-2016]                          |
| EA200: Description                                               | TP-2A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-3A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-4A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-5A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-6A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-7A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-8A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-9A - [30-Jun-2016]                          |
| EA200: Description                                               | TP-10A - [30-Jun-2016]                         |
| EA200: Description                                               | DUP-01 - [30-Jun-2016]                         |
| EA200: Description                                               | SHED C-1 - [30-Jun-2016]                       |
| EA200: Description                                               | HOUSE C-1 - [30-Jun-2016]                      |



## Surrogate Control Limits

| Sub-Matrix: SOIL                                    |            | Recovery Limits (%) |      |
|-----------------------------------------------------|------------|---------------------|------|
| Compound                                            | CAS Number | Low                 | High |
| <b>EP066S: PCB Surrogate</b>                        |            |                     |      |
| Decachlorobiphenyl                                  | 2051-24-3  | 39                  | 149  |
| <b>EP068S: Organochlorine Pesticide Surrogate</b>   |            |                     |      |
| Dibromo-DDE                                         | 21655-73-2 | 49                  | 147  |
| <b>EP068T: Organophosphorus Pesticide Surrogate</b> |            |                     |      |
| DEF                                                 | 78-48-8    | 35                  | 143  |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>    |            |                     |      |
| Phenol-d6                                           | 13127-88-3 | 63                  | 123  |
| 2-Chlorophenol-D4                                   | 93951-73-6 | 66                  | 122  |
| 2,4,6-Tribromophenol                                | 118-79-6   | 40                  | 138  |
| <b>EP075(SIM)T: PAH Surrogates</b>                  |            |                     |      |
| 2-Fluorobiphenyl                                    | 321-60-8   | 70                  | 122  |
| Anthracene-d10                                      | 1719-06-8  | 66                  | 128  |
| 4-Terphenyl-d14                                     | 1718-51-0  | 65                  | 129  |
| <b>EP080S: TPH(V)/BTEX Surrogates</b>               |            |                     |      |
| 1,2-Dichloroethane-D4                               | 17060-07-0 | 73                  | 133  |
| Toluene-D8                                          | 2037-26-5  | 74                  | 132  |
| 4-Bromofluorobenzene                                | 460-00-4   | 72                  | 130  |



## QA/QC Compliance Assessment to assist with Quality Review

|              |                       |                         |                                 |
|--------------|-----------------------|-------------------------|---------------------------------|
| Work Order   | : ES1614401           | Page                    | : 1 of 7                        |
| Client       | : EARTH2WATER PTY LTD | Laboratory              | : Environmental Division Sydney |
| Contact      | : MR DINO PARISOTTO   | Telephone               | : +61-2-8784 8555               |
| Project      | : ----                | Date Samples Received   | : 01-Jul-2016                   |
| Site         | : KMC HOUSE GWORKS    | Issue Date              | : 08-Jul-2016                   |
| Sampler      | : DINO PARISOTTO      | No. of samples received | : 21                            |
| Order number | : E2W-247             | No. of samples analysed | : 19                            |

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

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

### Summary of Outliers

#### Outliers : Quality Control Samples

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

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

#### Outliers : Analysis Holding Time Compliance

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

#### Outliers : Frequency of Quality Control Samples

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

Page : 2 of 7  
 Work Order : ES1614401  
 Client : EARTH2WATER PTY LTD  
 Project : ----



### Regular Sample Surrogates

Sub-Matrix: **SOIL**

| Compound Group Name            | Laboratory Sample ID | Client Sample ID | Analyte              | CAS Number | Data   | Limits   | Comment                                         |
|--------------------------------|----------------------|------------------|----------------------|------------|--------|----------|-------------------------------------------------|
| <b>Samples Submitted</b>       |                      |                  |                      |            |        |          |                                                 |
| EP080S: TPH(V)/BTEX Surrogates | ES1614401-010        | TP-5A            | 4-Bromofluorobenzene | 460-00-4   | 71.9 % | 72-130 % | Recovery less than lower data quality objective |

### Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

| Quality Control Sample Type | Count |         | Rate (%) |          | Quality Control Specification  |
|-----------------------------|-------|---------|----------|----------|--------------------------------|
| Method                      | QC    | Regular | Actual   | Expected |                                |
| <b>Matrix Spikes (MS)</b>   |       |         |          |          |                                |
| Total Metals by ICP-AES     | 1     | 21      | 4.76     | 5.00     | NEPM 2013 B3 & ALS QC Standard |

### Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

| Method                                                                                 |                                                                               | Sample Date | Extraction / Preparation |                    |            | Analysis      |                  |            |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| Container / Client Sample ID(s)                                                        |                                                                               |             | Date extracted           | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| <b>EA055: Moisture Content</b>                                                         |                                                                               |             |                          |                    |            |               |                  |            |
| <b>Soil Glass Jar - Unpreserved (EA055-103)</b>                                        |                                                                               |             |                          |                    |            |               |                  |            |
| BH-1A,<br>TP-1A,<br>TP-2A,<br>TP-3A,<br>TP-5A,<br>TP-6A,<br>TP-8A,<br>TP-9A,<br>DUP-01 | BH-2A,<br>TP-1B,<br>TP-2B,<br>TP-4A,<br>TP-5B,<br>TP-7A,<br>TP-8B,<br>TP-10A, | 30-Jun-2016 | ----                     | ----               | ----       | 04-Jul-2016   | 14-Jul-2016      | ✔          |
| <b>Soil Glass Jar - Unpreserved (EA055-103)</b>                                        |                                                                               |             |                          |                    |            |               |                  |            |
| SHED C-1,                                                                              | HOUSE C-1                                                                     | 30-Jun-2016 | ----                     | ----               | ----       | 05-Jul-2016   | 14-Jul-2016      | ✔          |





Matrix: **SOIL**

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

| Method                                                                                                                                         |  | Sample Date | Extraction / Preparation |                    |            | Analysis      |                  |            |
|------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| Container / Client Sample ID(s)                                                                                                                |  |             | Date extracted           | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EA200: AS 4964 - 2004 Identification of Asbestos in Soils                                                                                      |  |             |                          |                    |            |               |                  |            |
| Snap Lock Bag - Subsampled by ALS (EA200)<br>TP-1B                                                                                             |  | 30-Jun-2016 | ----                     | ----               | ----       | 05-Jul-2016   | 27-Dec-2016      | ✓          |
| Snap Lock Bag: Separate bag received (EA200)<br>BH-1A, TP-1A, TP-3A, TP-5A, TP-7A, TP-9A, DUP-01<br>BH-2A, TP-2A, TP-4A, TP-6A, TP-8A, TP-10A, |  | 30-Jun-2016 | ----                     | ----               | ----       | 05-Jul-2016   | 27-Dec-2016      | ✓          |
| Snap Lock Bag: Separate bag received (EA200)<br>SHED C-1, HOUSE C-1                                                                            |  | 30-Jun-2016 | ----                     | ----               | ----       | 06-Jul-2016   | 27-Dec-2016      | ✓          |
| EG005T: Total Metals by ICP-AES                                                                                                                |  |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EG005T)<br>BH-1A, TP-1A, TP-3A, TP-5A, TP-8A, DUP-01, HOUSE C-1<br>BH-2A, TP-2A, TP-4A, TP-6A, TP-10A, SHED C-1, |  | 30-Jun-2016 | 05-Jul-2016              | 27-Dec-2016        | ✓          | 06-Jul-2016   | 27-Dec-2016      | ✓          |
| EG035T: Total Recoverable Mercury by FIMS                                                                                                      |  |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EG035T)<br>BH-1A, TP-1A, TP-3A, TP-5A, TP-8A, DUP-01, HOUSE C-1<br>BH-2A, TP-2A, TP-4A, TP-6A, TP-10A, SHED C-1, |  | 30-Jun-2016 | 05-Jul-2016              | 28-Jul-2016        | ✓          | 06-Jul-2016   | 28-Jul-2016      | ✓          |
| EK026SF: Total CN by Segmented Flow Analyser                                                                                                   |  |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EK026SF)<br>BH-1A, TP-1A, TP-4A, TP-10A,<br>BH-2A, TP-2A, TP-5A, DUP-01                                          |  | 30-Jun-2016 | 04-Jul-2016              | 14-Jul-2016        | ✓          | 05-Jul-2016   | 18-Jul-2016      | ✓          |
| EP066: Polychlorinated Biphenyls (PCB)                                                                                                         |  |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EP066)<br>TP-3A, TP-8A<br>TP-6A,                                                                                 |  | 30-Jun-2016 | 04-Jul-2016              | 14-Jul-2016        | ✓          | 05-Jul-2016   | 13-Aug-2016      | ✓          |



Matrix: **SOIL**

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

| Method                                                                                                           |                                                                    | Sample Date | Extraction / Preparation |                    |            | Analysis      |                  |            |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| Container / Client Sample ID(s)                                                                                  |                                                                    |             | Date extracted           | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EP068A: Organochlorine Pesticides (OC)                                                                           |                                                                    |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EP068)<br>TP-3A,<br>TP-8A                                                          | TP-6A,                                                             | 30-Jun-2016 | 04-Jul-2016              | 14-Jul-2016        | ✓          | 05-Jul-2016   | 13-Aug-2016      | ✓          |
| EP080/071: Total Petroleum Hydrocarbons                                                                          |                                                                    |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EP071)<br>BH-1A,<br>TP-1A,<br>TP-2B,<br>TP-4A,<br>TP-5B,<br>TP-8A,<br>TP-10A,      | BH-2A,<br>TP-2A,<br>TP-3A,<br>TP-5A,<br>TP-6A,<br>TP-8B,<br>DUP-01 | 30-Jun-2016 | 04-Jul-2016              | 14-Jul-2016        | ✓          | 05-Jul-2016   | 13-Aug-2016      | ✓          |
| Soil Glass Jar - Unpreserved (EP071)<br>SHED C-1,                                                                | HOUSE C-1                                                          | 30-Jun-2016 | 05-Jul-2016              | 14-Jul-2016        | ✓          | 06-Jul-2016   | 14-Aug-2016      | ✓          |
| EP075(SIM)B: Polynuclear Aromatic Hydrocarbons                                                                   |                                                                    |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EP075(SIM))<br>BH-1A,<br>TP-1A,<br>TP-2A,<br>TP-4A,<br>TP-6A,<br>TP-8A,<br>TP-10A, | BH-2A,<br>TP-1B,<br>TP-3A,<br>TP-5A,<br>TP-7A,<br>TP-9A,<br>DUP-01 | 30-Jun-2016 | 04-Jul-2016              | 14-Jul-2016        | ✓          | 05-Jul-2016   | 13-Aug-2016      | ✓          |
| Soil Glass Jar - Unpreserved (EP075(SIM))<br>SHED C-1,                                                           | HOUSE C-1                                                          | 30-Jun-2016 | 05-Jul-2016              | 14-Jul-2016        | ✓          | 06-Jul-2016   | 14-Aug-2016      | ✓          |
| EP080/071: Total Petroleum Hydrocarbons                                                                          |                                                                    |             |                          |                    |            |               |                  |            |
| Soil Glass Jar - Unpreserved (EP080)<br>BH-1A,<br>TP-1A,<br>TP-2B,<br>TP-4A,<br>TP-5B,<br>TP-8A,<br>TP-10A,      | BH-2A,<br>TP-2A,<br>TP-3A,<br>TP-5A,<br>TP-6A,<br>TP-8B,<br>DUP-01 | 30-Jun-2016 | 04-Jul-2016              | 14-Jul-2016        | ✓          | 07-Jul-2016   | 14-Jul-2016      | ✓          |
| Soil Glass Jar - Unpreserved (EP080)<br>SHED C-1,                                                                | HOUSE C-1                                                          | 30-Jun-2016 | 05-Jul-2016              | 14-Jul-2016        | ✓          | 05-Jul-2016   | 14-Jul-2016      | ✓          |





## Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

| Quality Control Sample Type              |            | Count |         | Rate (%) |          |            | Quality Control Specification  |
|------------------------------------------|------------|-------|---------|----------|----------|------------|--------------------------------|
| Analytical Methods                       | Method     | QC    | Regular | Actual   | Expected | Evaluation |                                |
| Laboratory Duplicates (DUP)              |            |       |         |          |          |            |                                |
| Moisture Content                         | EA055-103  | 6     | 58      | 10.34    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| PAH/Phenols (SIM)                        | EP075(SIM) | 4     | 25      | 16.00    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Pesticides by GCMS                       | EP068      | 1     | 3       | 33.33    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Polychlorinated Biphenyls (PCB)          | EP066      | 1     | 3       | 33.33    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Cyanide by Segmented Flow Analyser | EK026SF    | 2     | 20      | 10.00    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Mercury by FIMS                    | EG035T     | 3     | 21      | 14.29    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-AES                  | EG005T     | 3     | 21      | 14.29    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TRH - Semivolatile Fraction              | EP071      | 4     | 25      | 16.00    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX                       | EP080      | 4     | 32      | 12.50    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS)         |            |       |         |          |          |            |                                |
| PAH/Phenols (SIM)                        | EP075(SIM) | 2     | 25      | 8.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Pesticides by GCMS                       | EP068      | 1     | 3       | 33.33    | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Polychlorinated Biphenyls (PCB)          | EP066      | 1     | 3       | 33.33    | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Cyanide by Segmented Flow Analyser | EK026SF    | 2     | 20      | 10.00    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Mercury by FIMS                    | EG035T     | 2     | 21      | 9.52     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-AES                  | EG005T     | 2     | 21      | 9.52     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TRH - Semivolatile Fraction              | EP071      | 2     | 25      | 8.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX                       | EP080      | 2     | 32      | 6.25     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB)                       |            |       |         |          |          |            |                                |
| PAH/Phenols (SIM)                        | EP075(SIM) | 2     | 25      | 8.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Pesticides by GCMS                       | EP068      | 1     | 3       | 33.33    | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Polychlorinated Biphenyls (PCB)          | EP066      | 1     | 3       | 33.33    | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Cyanide by Segmented Flow Analyser | EK026SF    | 1     | 20      | 5.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Mercury by FIMS                    | EG035T     | 2     | 21      | 9.52     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-AES                  | EG005T     | 2     | 21      | 9.52     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TRH - Semivolatile Fraction              | EP071      | 2     | 25      | 8.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX                       | EP080      | 2     | 32      | 6.25     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS)                       |            |       |         |          |          |            |                                |
| PAH/Phenols (SIM)                        | EP075(SIM) | 2     | 25      | 8.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Pesticides by GCMS                       | EP068      | 1     | 3       | 33.33    | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Polychlorinated Biphenyls (PCB)          | EP066      | 1     | 3       | 33.33    | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Cyanide by Segmented Flow Analyser | EK026SF    | 1     | 20      | 5.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Mercury by FIMS                    | EG035T     | 2     | 21      | 9.52     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-AES                  | EG005T     | 1     | 21      | 4.76     | 5.00     | ✗          | NEPM 2013 B3 & ALS QC Standard |
| TRH - Semivolatile Fraction              | EP071      | 2     | 25      | 8.00     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX                       | EP080      | 2     | 32      | 6.25     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |



## Brief Method Summaries

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

| Analytical Methods                       | Method     | Matrix | Method Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------|------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Moisture Content                         | EA055-103  | SOIL   | In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Asbestos Identification in Soils         | EA200      | SOIL   | AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples<br>Analysis by Polarised Light Microscopy including dispersion staining                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Total Metals by ICP-AES                  | EG005T     | SOIL   | In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Total Mercury by FIMS                    | EG035T     | SOIL   | In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl <sub>2</sub> )(Cold Vapour generation) AAS)<br>FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl <sub>2</sub> which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)                                                                                                                                                                                                                                                                                                                                                          |
| Total Cyanide by Segmented Flow Analyser | EK026SF    | SOIL   | In house: Referenced to APHA 4500-CN C / ASTM D7511. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3) |
| Polychlorinated Biphenyls (PCB)          | EP066      | SOIL   | In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Pesticides by GCMS                       | EP068      | SOIL   | In house: Referenced to USEPA SW 846 - 8270D 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)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| TRH - Semivolatile Fraction              | EP071      | SOIL   | In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| PAH/Phenols (SIM)                        | EP075(SIM) | SOIL   | In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| TRH Volatiles/BTEX                       | EP080      | SOIL   | In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Preparation Methods                      | Method     | Matrix | Method Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| NaOH leach for CN in Soils               | CN-PR      | SOIL   | In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |





| Preparation Methods                                           | Method  | Matrix | Method Descriptions                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------|---------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hot Block Digest for metals in soils<br>sediments and sludges | EN69    | SOIL   | In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202) |
| Methanolic Extraction of Soils for Purge<br>and Trap          | * ORG16 | SOIL   | In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.                                                                                                                                                                                                                                                                       |
| Tumbler Extraction of Solids                                  | ORG17   | SOIL   | In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.                                                                                                                                                                          |

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES1614998**  
**Client** : **EARTH2WATER PTY LTD**  
**Contact** : **MR DINO PARISOTTO**  
**Address** : **PO BOX 189**  
**JAMBEROO NSW, AUSTRALIA 2533**  
**Telephone** : **+61 4236 1334**  
**Project** : **----**  
**Order number** : **E2W-247**  
**C-O-C number** : **----**  
**Sampler** : **DINO PARISOTTO**  
**Site** : **KMC HOUSE GWORKS**  
**Quote number** : **----**  
**No. of samples received** : **7**  
**No. of samples analysed** : **7**

**Page** : 1 of 8  
**Laboratory** : Environmental Division Sydney  
**Contact** :  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 11-Jul-2016 13:05  
**Date Analysis Commenced** : 12-Jul-2016  
**Issue Date** : 15-Jul-2016 14:06

NATA Accredited Laboratory 825  
 Accredited for compliance with  
 ISO/IEC 17025.



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

| <i>Signatories</i> | <i>Position</i>       | <i>Accreditation Category</i>      |
|--------------------|-----------------------|------------------------------------|
| Celine Conceicao   | Senior Spectroscopist | Sydney Inorganics, Smithfield, NSW |
| Edwandy Fadjjar    | Organic Coordinator   | Sydney Organics, Smithfield, NSW   |





## General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

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



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                    |                   |     |         | Client sample ID | SHED C-1      | TP-10A        | TP-6A         | TP-2B         | TP-5B         |
|-------------------------------------------------------|-------------------|-----|---------|------------------|---------------|---------------|---------------|---------------|---------------|
| Client sampling date / time                           |                   |     |         |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                              | CAS Number        | LOR | Unit    |                  | ES1614998-001 | ES1614998-002 | ES1614998-003 | ES1614998-004 | ES1614998-005 |
|                                                       |                   |     |         |                  | Result        | Result        | Result        | Result        | Result        |
| <b>EA055: Moisture Content</b>                        |                   |     |         |                  |               |               |               |               |               |
| Moisture Content (dried @ 103°C)                      | ----              | 1   | %       |                  | ----          | ----          | ----          | 27.6          | 26.6          |
| <b>EN33: TCLP Leach</b>                               |                   |     |         |                  |               |               |               |               |               |
| Initial pH                                            | ----              | 0.1 | pH Unit |                  | 6.2           | 6.4           | 6.8           | ----          | ----          |
| After HCl pH                                          | ----              | 0.1 | pH Unit |                  | 2.1           | 1.8           | 1.8           | ----          | ----          |
| Extraction Fluid Number                               | ----              | 1   | -       |                  | 1             | 1             | 1             | ----          | ----          |
| Final pH                                              | ----              | 0.1 | pH Unit |                  | 5.0           | 5.0           | 4.9           | ----          | ----          |
| <b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b> |                   |     |         |                  |               |               |               |               |               |
| 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          |
| Benzo(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+j)fluoranthene                                | 205-99-2 205-82-3 | 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           |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>      |                   |     |         |                  |               |               |               |               |               |
| Phenol-d6                                             | 13127-88-3        | 0.5 | %       |                  | ----          | ----          | ----          | 97.4          | 94.7          |
| 2-Chlorophenol-D4                                     | 93951-73-6        | 0.5 | %       |                  | ----          | ----          | ----          | 89.9          | 87.0          |
| 2,4,6-Tribromophenol                                  | 118-79-6          | 0.5 | %       |                  | ----          | ----          | ----          | 74.6          | 72.2          |
| <b>EP075(SIM)T: PAH Surrogates</b>                    |                   |     |         |                  |               |               |               |               |               |
| 2-Fluorobiphenyl                                      | 321-60-8          | 0.5 | %       |                  | ----          | ----          | ----          | 89.4          | 88.2          |
| Anthracene-d10                                        | 1719-06-8         | 0.5 | %       |                  | ----          | ----          | ----          | 106           | 104           |



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 Work Order : ES1614998  
 Client : EARTH2WATER PTY LTD  
 Project : ----



## Analytical Results

|                                         |            |     |      |                  |               |               |               |               |               |
|-----------------------------------------|------------|-----|------|------------------|---------------|---------------|---------------|---------------|---------------|
| Sub-Matrix: SOIL<br>(Matrix: SOIL)      |            |     |      | Client sample ID | SHED C-1      | TP-10A        | TP-6A         | TP-2B         | TP-5B         |
| Client sampling date / time             |            |     |      |                  | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] |
| Compound                                | CAS Number | LOR | Unit |                  | ES1614998-001 | ES1614998-002 | ES1614998-003 | ES1614998-004 | ES1614998-005 |
|                                         |            |     |      |                  | Result        | Result        | Result        | Result        | Result        |
| EP075(SIM)T: PAH Surrogates - Continued |            |     |      |                  |               |               |               |               |               |
| 4-Terphenyl-d14                         | 1718-51-0  | 0.5 | %    |                  | ----          | ----          | ----          | 94.2          | 92.7          |



## Analytical Results

|                                                       |                   |     |         |                  |               |               |       |       |       |
|-------------------------------------------------------|-------------------|-----|---------|------------------|---------------|---------------|-------|-------|-------|
| Sub-Matrix: SOIL<br>(Matrix: SOIL)                    |                   |     |         | Client sample ID | TP-10B        | TP-2A         | ----  | ----  | ----  |
| Client sampling date / time                           |                   |     |         |                  | [30-Jun-2016] | [30-Jun-2016] | ----  | ----  | ----  |
| Compound                                              | CAS Number        | LOR | Unit    |                  | ES1614998-006 | ES1614998-007 | ----- | ----- | ----- |
|                                                       |                   |     |         | Result           | Result        |               | ----  | ----  | ----  |
| <b>EA055: Moisture Content</b>                        |                   |     |         |                  |               |               |       |       |       |
| Moisture Content (dried @ 103°C)                      | ----              | 1   | %       |                  | 26.0          | ----          | ----  | ----  | ----  |
| <b>EN33: TCLP Leach</b>                               |                   |     |         |                  |               |               |       |       |       |
| Initial pH                                            | ----              | 0.1 | pH Unit |                  | ----          | 7.0           | ----  | ----  | ----  |
| After HCl pH                                          | ----              | 0.1 | pH Unit |                  | ----          | 1.8           | ----  | ----  | ----  |
| Extraction Fluid Number                               | ----              | 1   | -       |                  | ----          | 1             | ----  | ----  | ----  |
| Final pH                                              | ----              | 0.1 | pH Unit |                  | ----          | 5.0           | ----  | ----  | ----  |
| <b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b> |                   |     |         |                  |               |               |       |       |       |
| Naphthalene                                           | 91-20-3           | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Acenaphthylene                                        | 208-96-8          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Acenaphthene                                          | 83-32-9           | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Fluorene                                              | 86-73-7           | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Phenanthrene                                          | 85-01-8           | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Anthracene                                            | 120-12-7          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Fluoranthene                                          | 206-44-0          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Pyrene                                                | 129-00-0          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Benz(a)anthracene                                     | 56-55-3           | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Chrysene                                              | 218-01-9          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Benzo(b+j)fluoranthene                                | 205-99-2 205-82-3 | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Benzo(k)fluoranthene                                  | 207-08-9          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Benzo(a)pyrene                                        | 50-32-8           | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Indeno(1.2.3.cd)pyrene                                | 193-39-5          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Dibenz(a,h)anthracene                                 | 53-70-3           | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| Benzo(g,h,i)perylene                                  | 191-24-2          | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| ^ Sum of polycyclic aromatic hydrocarbons             | ----              | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| ^ Benzo(a)pyrene TEQ (zero)                           | ----              | 0.5 | mg/kg   |                  | <0.5          | ----          | ----  | ----  | ----  |
| ^ Benzo(a)pyrene TEQ (half LOR)                       | ----              | 0.5 | mg/kg   |                  | 0.6           | ----          | ----  | ----  | ----  |
| ^ Benzo(a)pyrene TEQ (LOR)                            | ----              | 0.5 | mg/kg   |                  | 1.2           | ----          | ----  | ----  | ----  |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>      |                   |     |         |                  |               |               |       |       |       |
| Phenol-d6                                             | 13127-88-3        | 0.5 | %       |                  | 100           | ----          | ----  | ----  | ----  |
| 2-Chlorophenol-D4                                     | 93951-73-6        | 0.5 | %       |                  | 88.6          | ----          | ----  | ----  | ----  |
| 2,4,6-Tribromophenol                                  | 118-79-6          | 0.5 | %       |                  | 70.8          | ----          | ----  | ----  | ----  |
| <b>EP075(SIM)T: PAH Surrogates</b>                    |                   |     |         |                  |               |               |       |       |       |
| 2-Fluorobiphenyl                                      | 321-60-8          | 0.5 | %       |                  | 89.5          | ----          | ----  | ----  | ----  |
| Anthracene-d10                                        | 1719-06-8         | 0.5 | %       |                  | 102           | ----          | ----  | ----  | ----  |



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 Work Order : ES1614998  
 Client : EARTH2WATER PTY LTD  
 Project : ----



## Analytical Results

|                                                   |            |     |      |                             |               |               |       |       |       |
|---------------------------------------------------|------------|-----|------|-----------------------------|---------------|---------------|-------|-------|-------|
| Sub-Matrix: <b>SOIL</b><br>(Matrix: <b>SOIL</b> ) |            |     |      | Client sample ID            | TP-10B        | TP-2A         | ----  | ----  | ----  |
|                                                   |            |     |      | Client sampling date / time | [30-Jun-2016] | [30-Jun-2016] | ----  | ----  | ----  |
| Compound                                          | CAS Number | LOR | Unit |                             | ES1614998-006 | ES1614998-007 | ----- | ----- | ----- |
|                                                   |            |     |      |                             | Result        | Result        | ----  | ----  | ----  |
| EP075(SIM)T: PAH Surrogates - Continued           |            |     |      |                             |               |               |       |       |       |
| 4-Terphenyl-d14                                   | 1718-51-0  | 0.5 | %    |                             | 93.5          | ----          | ----  | ----  | ----  |



## Analytical Results

Sub-Matrix: TCLP LEACHATE  
 (Matrix: WATER)

Client sample ID

|                                                       |                   |     |      | SHED C-1      | TP-10A        | TP-6A         | TP-2A         | ----  |
|-------------------------------------------------------|-------------------|-----|------|---------------|---------------|---------------|---------------|-------|
| Client sampling date / time                           |                   |     |      | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | [30-Jun-2016] | ----  |
| Compound                                              | CAS Number        | LOR | Unit | ES1614998-001 | ES1614998-002 | ES1614998-003 | ES1614998-007 | ----- |
|                                                       |                   |     |      | Result        | Result        | Result        | Result        | ----  |
| <b>EG005C: Leachable Metals by ICPAES</b>             |                   |     |      |               |               |               |               |       |
| Copper                                                | 7440-50-8         | 0.1 | mg/L | <0.1          | ----          | ----          | ----          | ----  |
| Lead                                                  | 7439-92-1         | 0.1 | mg/L | <0.1          | <0.1          | <0.1          | ----          | ----  |
| Zinc                                                  | 7440-66-6         | 0.1 | mg/L | 20.7          | ----          | ----          | ----          | ----  |
| <b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b> |                   |     |      |               |               |               |               |       |
| Naphthalene                                           | 91-20-3           | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Acenaphthylene                                        | 208-96-8          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Acenaphthene                                          | 83-32-9           | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Fluorene                                              | 86-73-7           | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Phenanthrene                                          | 85-01-8           | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Anthracene                                            | 120-12-7          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Fluoranthene                                          | 206-44-0          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Pyrene                                                | 129-00-0          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Benz(a)anthracene                                     | 56-55-3           | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Chrysene                                              | 218-01-9          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Benzo(b+j)fluoranthene                                | 205-99-2 205-82-3 | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Benzo(k)fluoranthene                                  | 207-08-9          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Benzo(a)pyrene                                        | 50-32-8           | 0.5 | µg/L | ----          | ----          | ----          | <0.5          | ----  |
| Indeno(1.2.3.cd)pyrene                                | 193-39-5          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Dibenz(a.h)anthracene                                 | 53-70-3           | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| Benzo(g.h.i)perylene                                  | 191-24-2          | 1   | µg/L | ----          | ----          | ----          | <1.0          | ----  |
| ^ Sum of polycyclic aromatic hydrocarbons             | ----              | 0.5 | µg/L | ----          | ----          | ----          | <0.5          | ----  |
| ^ Benzo(a)pyrene TEQ (zero)                           | ----              | 0.5 | µg/L | ----          | ----          | ----          | <0.5          | ----  |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>      |                   |     |      |               |               |               |               |       |
| Phenol-d6                                             | 13127-88-3        | 1   | %    | ----          | ----          | ----          | 30.0          | ----  |
| 2-Chlorophenol-D4                                     | 93951-73-6        | 1   | %    | ----          | ----          | ----          | 56.0          | ----  |
| 2,4,6-Tribromophenol                                  | 118-79-6          | 1   | %    | ----          | ----          | ----          | 69.8          | ----  |
| <b>EP075(SIM)T: PAH Surrogates</b>                    |                   |     |      |               |               |               |               |       |
| 2-Fluorobiphenyl                                      | 321-60-8          | 1   | %    | ----          | ----          | ----          | 79.6          | ----  |
| Anthracene-d10                                        | 1719-06-8         | 1   | %    | ----          | ----          | ----          | 82.1          | ----  |
| 4-Terphenyl-d14                                       | 1718-51-0         | 1   | %    | ----          | ----          | ----          | 69.3          | ----  |





## Surrogate Control Limits

| Sub-Matrix: SOIL                                 |            | Recovery Limits (%) |      |
|--------------------------------------------------|------------|---------------------|------|
| Compound                                         | CAS Number | Low                 | High |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b> |            |                     |      |
| Phenol-d6                                        | 13127-88-3 | 63                  | 123  |
| 2-Chlorophenol-D4                                | 93951-73-6 | 66                  | 122  |
| 2,4,6-Tribromophenol                             | 118-79-6   | 40                  | 138  |
| <b>EP075(SIM)T: PAH Surrogates</b>               |            |                     |      |
| 2-Fluorobiphenyl                                 | 321-60-8   | 70                  | 122  |
| Anthracene-d10                                   | 1719-06-8  | 66                  | 128  |
| 4-Terphenyl-d14                                  | 1718-51-0  | 65                  | 129  |

| Sub-Matrix: TCLP LEACHATE                        |            | Recovery Limits (%) |      |
|--------------------------------------------------|------------|---------------------|------|
| Compound                                         | CAS Number | Low                 | High |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b> |            |                     |      |
| Phenol-d6                                        | 13127-88-3 | 10                  | 44   |
| 2-Chlorophenol-D4                                | 93951-73-6 | 14                  | 94   |
| 2,4,6-Tribromophenol                             | 118-79-6   | 17                  | 125  |
| <b>EP075(SIM)T: PAH Surrogates</b>               |            |                     |      |
| 2-Fluorobiphenyl                                 | 321-60-8   | 20                  | 104  |
| Anthracene-d10                                   | 1719-06-8  | 27                  | 113  |
| 4-Terphenyl-d14                                  | 1718-51-0  | 32                  | 112  |

## QA/QC Compliance Assessment to assist with Quality Review

|              |                       |                         |                                 |
|--------------|-----------------------|-------------------------|---------------------------------|
| Work Order   | : ES1614998           | Page                    | : 1 of 5                        |
| Client       | : EARTH2WATER PTY LTD | Laboratory              | : Environmental Division Sydney |
| Contact      | : MR DINO PARISOTTO   | Telephone               | : +61-2-8784 8555               |
| Project      | : ----                | Date Samples Received   | : 11-Jul-2016                   |
| Site         | : KMC HOUSE GWORKS    | Issue Date              | : 15-Jul-2016                   |
| Sampler      | : DINO PARISOTTO      | No. of samples received | : 7                             |
| Order number | : E2W-247             | No. of samples analysed | : 7                             |

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

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

### Summary of Outliers

#### Outliers : Quality Control Samples

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

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

#### Outliers : Analysis Holding Time Compliance

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

#### Outliers : Frequency of Quality Control Samples

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





### Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

| Compound Group Name                 | Laboratory Sample ID | Client Sample ID | Analyte | CAS Number | Data           | Limits | Comment                                                                               |
|-------------------------------------|----------------------|------------------|---------|------------|----------------|--------|---------------------------------------------------------------------------------------|
| <b>Matrix Spike (MS) Recoveries</b> |                      |                  |         |            |                |        |                                                                                       |
| EG005C: Leachable Metals by ICPAES  | ES1614998--002       | TP-10A           | Zinc    | 7440-66-6  | Not Determined | ----   | MS recovery not determined, background level greater than or equal to 4x spike level. |

### Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

| Quality Control Sample Type        | Count |         | Rate (%) |          | Quality Control Specification  |
|------------------------------------|-------|---------|----------|----------|--------------------------------|
| Method                             | QC    | Regular | Actual   | Expected |                                |
| <b>Laboratory Duplicates (DUP)</b> |       |         |          |          |                                |
| PAH/Phenols (GC/MS - SIM)          | 0     | 14      | 0.00     | 10.00    | NEPM 2013 B3 & ALS QC Standard |
| <b>Matrix Spikes (MS)</b>          |       |         |          |          |                                |
| PAH/Phenols (GC/MS - SIM)          | 0     | 14      | 0.00     | 5.00     | NEPM 2013 B3 & ALS QC Standard |

### Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

| Method                                                            |         | Sample Date | Extraction / Preparation |                    |            | Analysis      |                  |            |
|-------------------------------------------------------------------|---------|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| Container / Client Sample ID(s)                                   |         |             | Date extracted           | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| <b>EA055: Moisture Content</b>                                    |         |             |                          |                    |            |               |                  |            |
| <b>Soil Glass Jar - Unpreserved (EA055-103)</b>                   |         |             |                          |                    |            |               |                  |            |
| TP-2B,                                                            | TP-5B,  | 30-Jun-2016 | ----                     | ----               | ----       | 13-Jul-2016   | 14-Jul-2016      | ✔          |
| TP-10B                                                            |         |             |                          |                    |            |               |                  |            |
| <b>EN33: TCLP Leach</b>                                           |         |             |                          |                    |            |               |                  |            |
| <b>Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN33a)</b>    |         |             |                          |                    |            |               |                  |            |
| TP-2A                                                             |         | 30-Jun-2016 | 12-Jul-2016              | 14-Jul-2016        | ✔          | ----          | ----             | ----       |
| <b>Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a)</b> |         |             |                          |                    |            |               |                  |            |
| SHED C-1,                                                         | TP-10A, | 30-Jun-2016 | 12-Jul-2016              | 27-Dec-2016        | ✔          | ----          | ----             | ----       |
| TP-6A                                                             |         |             |                          |                    |            |               |                  |            |
| <b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>             |         |             |                          |                    |            |               |                  |            |
| <b>Soil Glass Jar - Unpreserved (EP075(SIM))</b>                  |         |             |                          |                    |            |               |                  |            |
| TP-2B,                                                            | TP-5B,  | 30-Jun-2016 | 12-Jul-2016              | 14-Jul-2016        | ✔          | 13-Jul-2016   | 21-Aug-2016      | ✔          |
| TP-10B                                                            |         |             |                          |                    |            |               |                  |            |

Matrix: **WATER**

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

Page : 3 of 5  
 Work Order : ES1614998  
 Client : EARTH2WATER PTY LTD  
 Project : ----



Matrix: **WATER**

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

| Method                                                                                | Sample Date | Extraction / Preparation |                    |            | Analysis      |                  |            |
|---------------------------------------------------------------------------------------|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| Container / Client Sample ID(s)                                                       |             | Date extracted           | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EG005C: Leachable Metals by ICPAES                                                    |             |                          |                    |            |               |                  |            |
| Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C)<br>SHED C-1, TP-6A<br>TP-10A, | 12-Jul-2016 | 13-Jul-2016              | 08-Jan-2017        | ✔          | 13-Jul-2016   | 08-Jan-2017      | ✔          |
| EP075(SIM)B: Polynuclear Aromatic Hydrocarbons                                        |             |                          |                    |            |               |                  |            |
| Amber Glass Bottle - Unpreserved (EP075(SIM))<br>TP-2A                                | 12-Jul-2016 | 13-Jul-2016              | 19-Jul-2016        | ✔          | 13-Jul-2016   | 22-Aug-2016      | ✔          |



## Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

| Quality Control Sample Type          |            | Count |         | Rate (%) |          |            | Quality Control Specification  |
|--------------------------------------|------------|-------|---------|----------|----------|------------|--------------------------------|
| Analytical Methods                   | Method     | QC    | Regular | Actual   | Expected | Evaluation |                                |
|                                      |            |       |         |          |          |            |                                |
| Laboratory Duplicates (DUP)          |            |       |         |          |          |            |                                |
| Moisture Content                     | EA055-103  | 2     | 20      | 10.00    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| PAH/Phenols (SIM)                    | EP075(SIM) | 2     | 12      | 16.67    | 10.00    | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS)     |            |       |         |          |          |            |                                |
| PAH/Phenols (SIM)                    | EP075(SIM) | 1     | 12      | 8.33     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB)                   |            |       |         |          |          |            |                                |
| PAH/Phenols (SIM)                    | EP075(SIM) | 1     | 12      | 8.33     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| TCLP for Non & Semivolatile Analytes | EN33a      | 1     | 11      | 9.09     | 9.09     | ✓          | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS)                   |            |       |         |          |          |            |                                |
| PAH/Phenols (SIM)                    | EP075(SIM) | 1     | 12      | 8.33     | 5.00     | ✓          | NEPM 2013 B3 & ALS QC Standard |

Matrix: **WATER**

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

| Quality Control Sample Type      |            | Count |         | Rate (%) |          |            | Quality Control Specification  |
|----------------------------------|------------|-------|---------|----------|----------|------------|--------------------------------|
| Analytical Methods               | Method     | QC    | Regular | Actual   | Expected | Evaluation |                                |
|                                  |            |       |         |          |          |            |                                |
| Laboratory Duplicates (DUP)      |            |       |         |          |          |            |                                |
| Leachable Metals by ICPAES       | EG005C     | 2     | 16      | 12.50    | 10.00    | ✔          | NEPM 2013 B3 & ALS QC Standard |
| PAH/Phenols (GC/MS - SIM)        | EP075(SIM) | 0     | 14      | 0.00     | 10.00    | ✖          | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) |            |       |         |          |          |            |                                |
| Leachable Metals by ICPAES       | EG005C     | 1     | 16      | 6.25     | 5.00     | ✔          | NEPM 2013 B3 & ALS QC Standard |
| PAH/Phenols (GC/MS - SIM)        | EP075(SIM) | 1     | 14      | 7.14     | 5.00     | ✔          | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB)               |            |       |         |          |          |            |                                |
| Leachable Metals by ICPAES       | EG005C     | 1     | 16      | 6.25     | 5.00     | ✔          | NEPM 2013 B3 & ALS QC Standard |
| PAH/Phenols (GC/MS - SIM)        | EP075(SIM) | 1     | 14      | 7.14     | 5.00     | ✔          | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS)               |            |       |         |          |          |            |                                |
| Leachable Metals by ICPAES       | EG005C     | 1     | 16      | 6.25     | 5.00     | ✔          | NEPM 2013 B3 & ALS QC Standard |
| PAH/Phenols (GC/MS - SIM)        | EP075(SIM) | 0     | 14      | 0.00     | 5.00     | ✖          | NEPM 2013 B3 & ALS QC Standard |



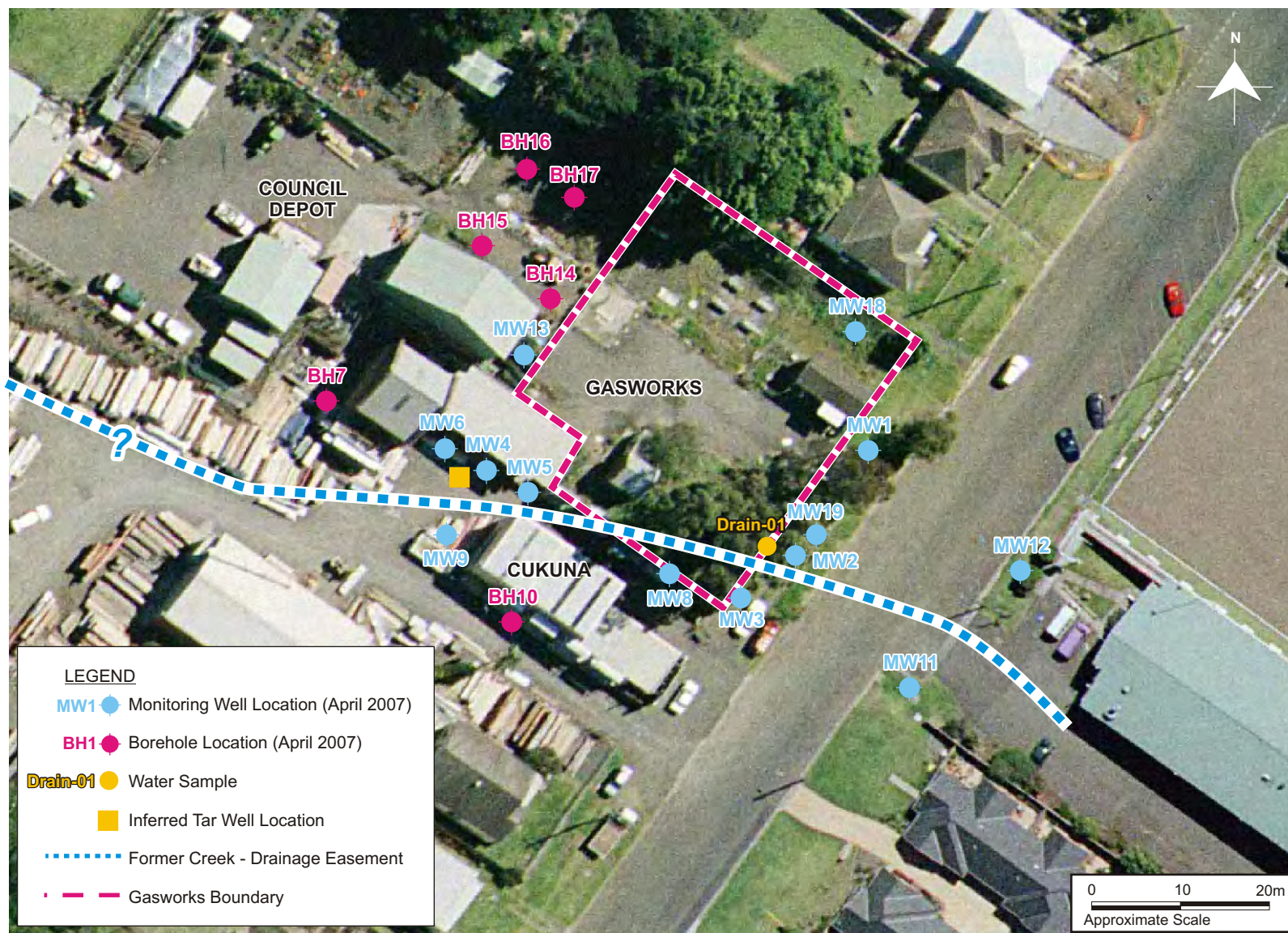


## Brief Method Summaries

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

| Analytical Methods                                      | Method     | Matrix | Method Descriptions                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------|------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Moisture Content                                        | EA055-103  | SOIL   | In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).                                                                                                                                                                             |
| Leachable Metals by ICPAES                              | EG005C     | SOIL   | In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)                                                                                                   |
| PAH/Phenols (SIM)                                       | EP075(SIM) | SOIL   | In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)                                                                                                         |
| Preparation Methods                                     | Method     | Matrix | Method Descriptions                                                                                                                                                                                                                                                                                                                                                                          |
| Digestion for Total Recoverable Metals in TCLP Leachate | EN25C      | SOIL   | In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)                                                                                                                                            |
| TCLP for Non & Semivolatile Analytes                    | EN33a      | SOIL   | In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.                                                                                                                                          |
| Separatory Funnel Extraction of Liquids                 | ORG14      | SOIL   | In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container. |
| Tumbler Extraction of Solids                            | ORG17      | SOIL   | In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.                                                                                                                                               |

## **Appendix D- E2W Previous Investigation (2007) Figures 1 to 5**



Source: Kiama Council

## SITE LAYOUT & SAMPLING LOCATIONS

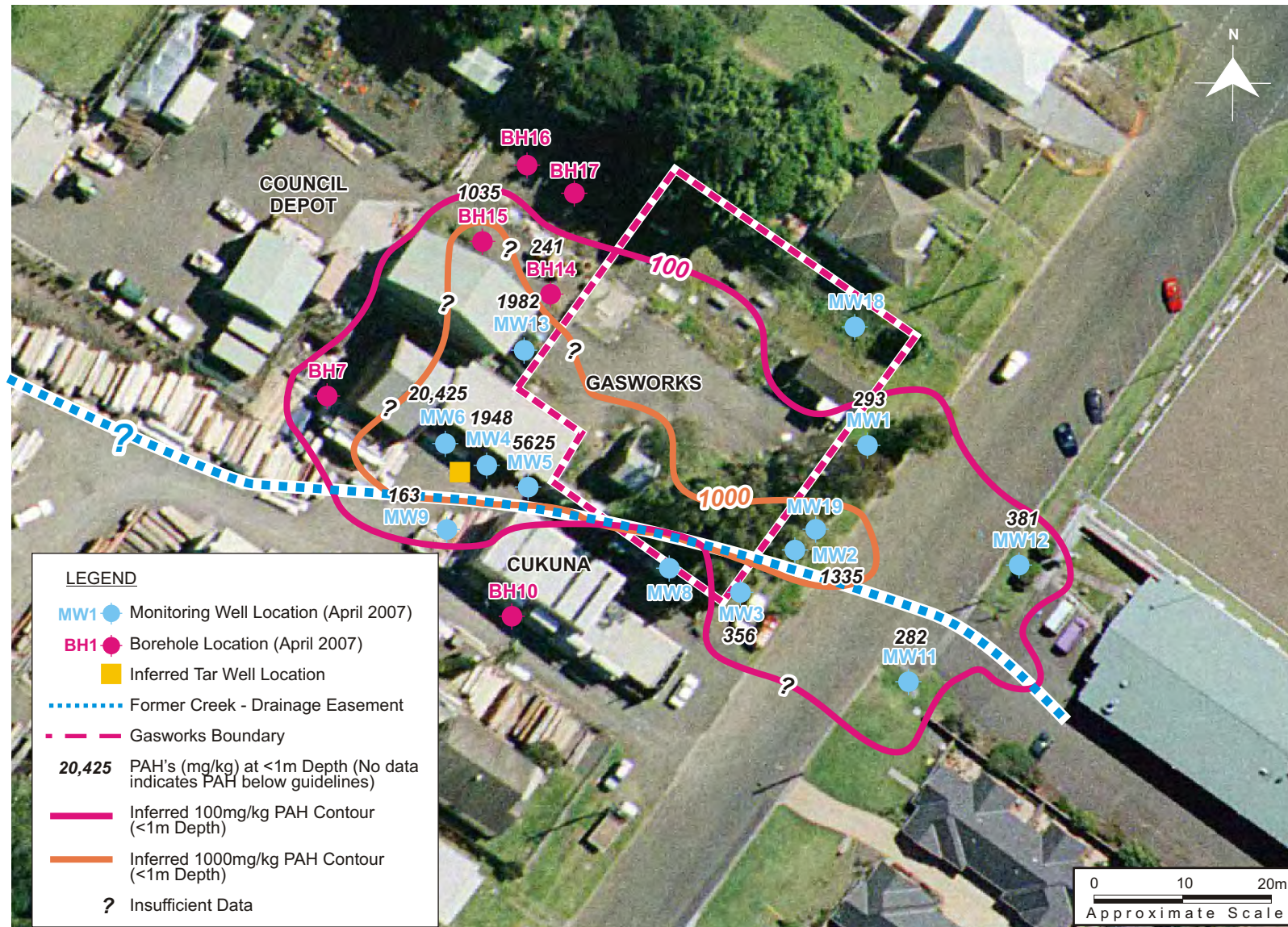
Date: 13 April 2007

KIAMA GASWORKS OFFSITE INVESTIGATION

Reference: E2W\_084\_01.cdr

Figure 1





**SITE LAYOUT & INFERRED PAH CONCENTRATIONS IN SHALLOW SOILS (<1m DEPTH)**

Source: Kiama Council

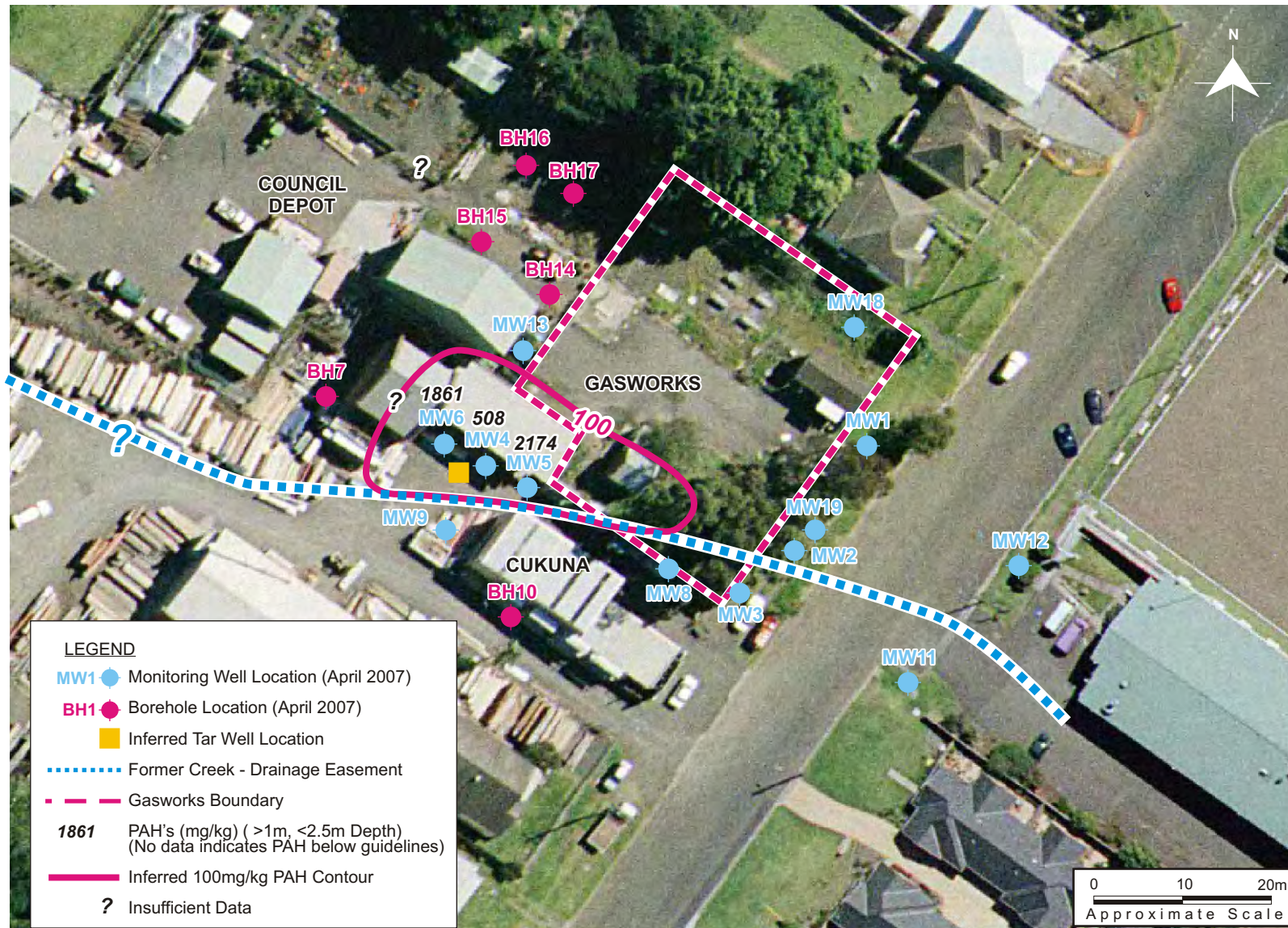
Date: 28 April 2007

Reference: E2W\_084\_02.cdr

KIAMA GASWORKS OFFSITE INVESTIGATION

Figure 2





Source: Kiama Council

## SITE LAYOUT & INFERRED PAH CONCENTRATIONS IN DEEP SOILS (>1m & <2.5m DEPTH)

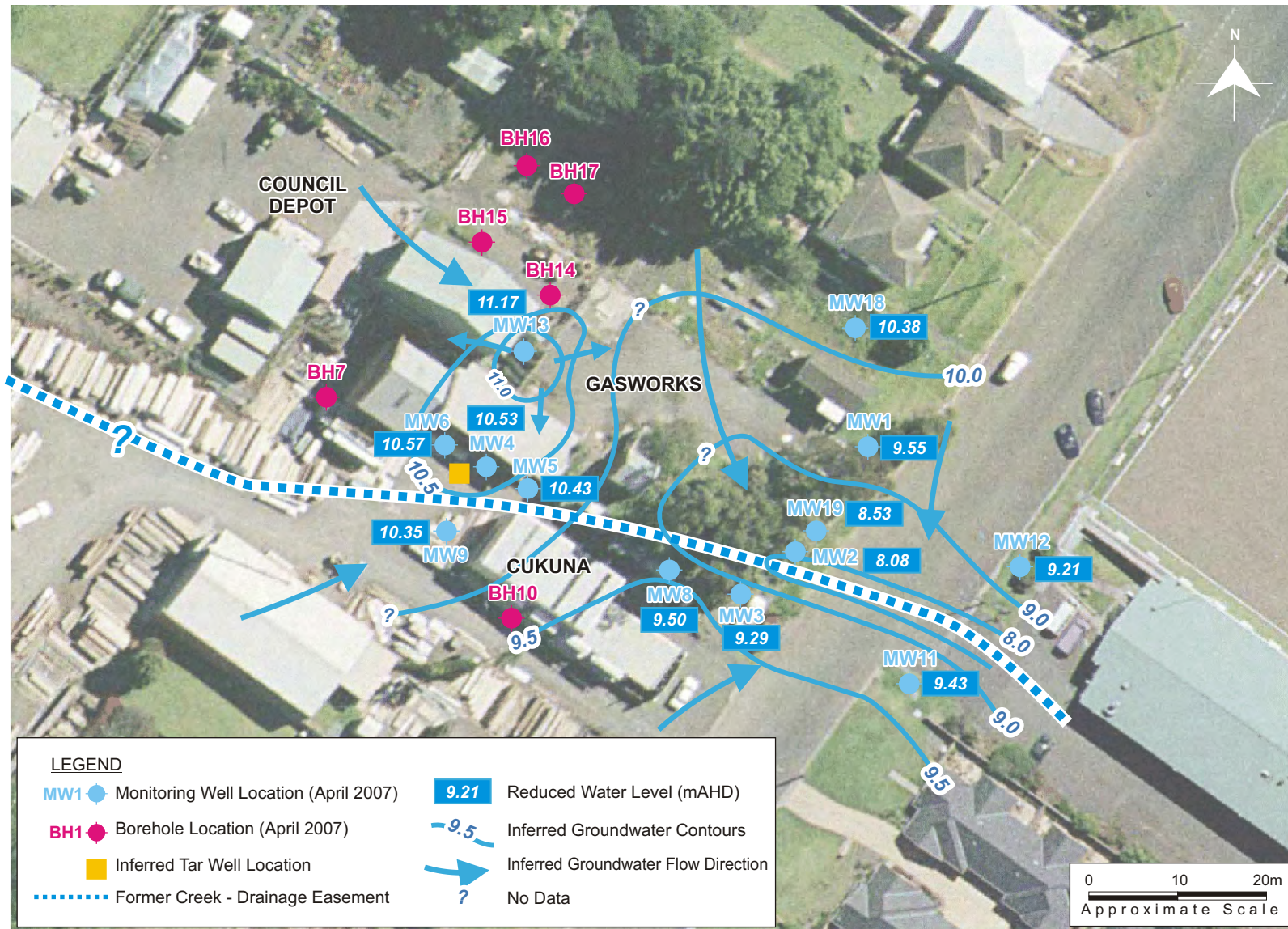
Date: 28 April 2007

Reference: E2W\_084\_03.cdr

KIAMA GASWORKS OFFSITE INVESTIGATION

Figure 3





## SITE LAYOUT & INFERRED GROUNDWATER FLOW REGIME (18 April 2007)

Source: Kiama Council

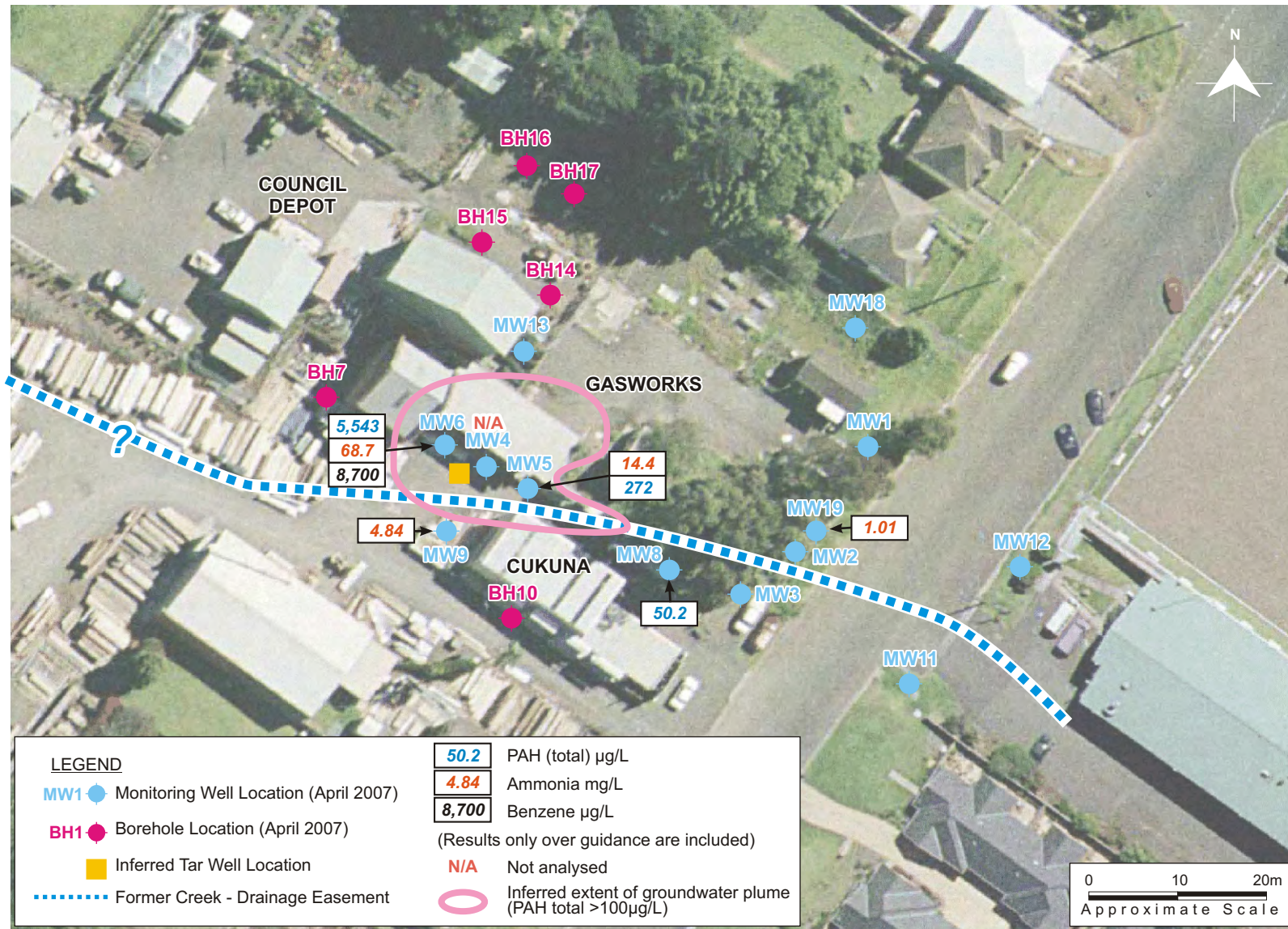
Date: 22 June 2007

Reference: E2W\_084\_04.cdr

KIAMA GASWORKS OFFSITE INVESTIGATION

Figure 4





## SITE LAYOUT & GROUNDWATER LABORATORY RESULTS (18 April 2007)

Source: Kiama Council

Date: 22 June 2007

Reference: E2W\_084\_05.cdr

KIAMA GASWORKS OFFSITE INVESTIGATION

Figure 5

## Appendix E- Data Quality Objectives

The data quality objectives (DQOs) ensure that the data obtained is sufficient to make decisions regarding the site. A summary of the DQO is provided in Table E-1 (below).

Table E-1 Data Quality Objectives

| Objective                                | Considerations                                                                                                                                                                                                                                                                                                                                       | How it was met                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1: State the problem                | Contamination status of soil conditions, remediation is required to facilitate land use change: change of landuse from commercial/residential to residential.                                                                                                                                                                                        | Stage 2 Preliminary contamination assessment (2016).<br>A Stage 3 assessment is recommended after demolishing works, removal of transpiration beds, impacted soils, and to assess data gaps (under foundations) and any asbestos impact associated with site clearing.                                                                                                                                                          |
| Step 2: Identify the decision            | Do the concentrations of contaminants related to legacy gasworks materials/fill exceed the adopted soil criteria for beneficial re-use or residential/commercial use of the site?<br>Can soil exceeding the adopted criteria be feasibly be removed offsite or remediated?                                                                           | Stage 2 investigation.<br>Asbestos assessment is recommended after buildings (containing asbestos) are demolished (stage 3 assessment).<br>Any remediation to be carried out to the extent practical (e.g. latent conditions or after building works). Any control measures to be addressed following site demolition works.                                                                                                    |
| Step 3: Identify inputs to decision      | Investigation carried out based on the contaminants of concern (TPH, BTEX, PAHs, cyanide, metals, asbestos) identified from review of the site history and previous investigation results.<br><br>Contaminated media potentially includes soil, and soil vapour.<br>Groundwater unlikely to occur at the site (>3m), due to bedrock at shallow depth | Areas and Contaminants of concern were identified during previous works (E2W 2007) at the neighbouring gas works.<br>Soil samples were analysed (TPH, BTEX, PAH, heavy metals, PCB, Organochlorine pesticides-OCP, and asbestos fibres) to characterise potentially contaminated soil and remaining residual soil. Groundwater samples were not collected.<br>Contaminants of concern compared to adopted criteria (NEPM 2013). |
| Step 4: Define the study boundaries      | The property boundary (104 Shoalhaven St, Kiama a small residential block, mostly fenced. Offsite pollution exists at the neighbouring gasworks site.                                                                                                                                                                                                | Site covers an area of approximately ~ 462 m2. The dimensions are ~14m by 33m.<br>No testing inside the building (possible asbestos issues – recommend testing site after demolition works completed).                                                                                                                                                                                                                          |
| Step 5: Develop a decision rule          | If soil is...<br><ul style="list-style-type: none"> <li>contaminated it will be excavated and stockpiled onsite and transported to a landfill.</li> <li>uncontaminated it is suitable for onsite or beneficial re-use (BRU)</li> </ul>                                                                                                               | Level of soil contamination identified (olfactory evidence, high vapour levels) and classified (based on laboratory analyses/adopted criteria).<br><br>Soil guidelines (including NEPM 2013) and investigation levels used for assessment are detailed in the assessment guidelines sections.                                                                                                                                   |
| Step 6: Specify limits on decision error | Sampling Errors<br>Sampling errors occur when the sampling program does not adequately represent site conditions.<br>Measurement Errors<br>Measurement errors occur during sample collection, handling, preparation, analysis and data reduction.                                                                                                    | Minimise/eliminate sampling errors by ensuring sufficient samples are collected for each stage of investigation.<br><br>Minimise/eliminate measurement errors by ensuring QA/QC procedures for sampling collection and laboratory analysis is carried out.<br><br>Decision making limits set accordingly, and Type I and Type II errors established.                                                                            |



|                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                  |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                | <p>Decision-making &amp; Null Hypothesis</p> <p>To enable the tolerable limits on the probability of decision error, a null hypothesis (H0) that the stockpiled soil is uncontaminated has been adopted. The following acceptable limits on decision error will be used:</p> <ul style="list-style-type: none"> <li>• Rejecting the null hypothesis when it is true (Type I error) – 20%</li> <li>• Accepting the null hypothesis when it is false (Type II error) – 5%</li> </ul> |                                                                                                                                                                                                                                                                  |
| Step 7: Optimise the design for obtaining data | Ensure resource-effective sampling and optimum manner for data collection during Stage 2 and Stage 3 (to commence after site demolition works).                                                                                                                                                                                                                                                                                                                                    | Samples were collected to assess contamination status on the site. Recommendations are provided for further testing (Stage 3 after demolition works, remedial works such as transpiration beds, septic tanks, gasworks waste-coke ash/slag, and impacted soils). |

## Appendix F- Limitations

Earth2Water Pty Ltd (E2W) has prepared this report for the use of Kiama Council in accordance with the standard terms and conditions of the consulting profession. This report should not be copied or distributed without written authorisation from E2W (Dino Parisotto).

The methodology adopted and sources of information used by E2W are outlined in this report. This report was prepared during June to August 2016 and is based on the information reviewed at the time of preparation. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

The precision with which conditions are indicated depends largely on the frequency and method of sampling, and the uniformity of conditions as constrained by the project budget limitations. The behaviour of groundwater and some aspects of contaminants in soil and groundwater are complex. Our conclusions are based upon the analytical data collected and presented in this report, and also from our experience on similar sites.

Where conditions encountered at the site are subsequently found to differ significantly from those anticipated in this report, E2W should be notified of any such findings and be provided with an opportunity to review the recommendations of this report.

LAST PAGE OF REPORT



***Thank you for the opportunity to work with  
Council.***

Feedback is Welcomed at Earth2Water  
([dino@earth2water.com.au](mailto:dino@earth2water.com.au))

