Attachment W

Groundwater Investigation-Addendum Report

Canberra Brickworks: Groundwater Investigation-Addendum Report

Canberra Brickwork Precinct, Yarralumla, ACT

3002523

For: Land Development Agency

Project Name:	Canberra Brickworks Site Investigation, Yarralumla, ACT
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REVIEWS AND APPROVALS FOR ISSUE

Revision	Date	Author	Reviewer	Approval
0	27/10/2016	Ryan O'Leary	Graham Ohmsen	Graham Ohmsen
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Executive Summary

Land Development Agency (LDA) commissioned SMEC Australia Pty Ltd (SMEC) to conduct an environmental site investigation of the Canberra Brickworks to determine the extent and quantity of contamination present at the site. The works involved examination of soil, surface and groundwater. This report is an addendum to the main report for the Canberra Brickworks.

The examination of groundwater involved installation of eight groundwater monitoring wells across the site, which were installed between 13 and 22 September 2016. Wells were installed to depths between 4.575 m bgl and 15.670 m bgl. Surface water samples were collected from three locations from the quarry area on 22 September and groundwater samples collected between 28 September and 17 October 2016.

Surface water was present as an ephemeral water body in the Pit area at the time of sampling. Standing water levels (SWL) ranged between 571.70 m AHD (M-6) to 582.86 m AHD (M-5). Groundwater was not recorded in two wells (M-1 and M-8) at the time of sampling.

The results of the physico-chemical parameters showed that there was an appreciable difference in pH between the surface water samples (3.96-3.99) and those from the groundwater (5.94 and 6.99). The difference in measured pH between the surface water and groundwater samples may be the result of the influence of organic acids derived from the breakdown of organic matter in the surface water body. Other possible factors which may account for the observed difference may include the potential for buffering and control of groundwater pH from the fill material and bedrock.

Other parameters, such as dissolved oxygen and redox potential indicated that both surface water and groundwater were relatively well oxygenated. The temperature of the groundwater exhibited a range of almost 6°C, from 14.4°C (M-5) to 20°C (M-7).

The analytical results for surface water samples indicated that BTEXN, TRH, PAH, OPP, OCP and PCB were below analytical detection limits. Of the metals, only zinc in W-2 (25 µg/L) and W-3 (22 µg/L) was found to exceed the NEPM EIL (amended 2013) screening criteria for fresh water. All other metals were either ***below*** detection limits or ***below*** the relevant assessment criteria.

The analytical results for the groundwater indicated that several of the COPC, namely TRH, PAH, OCP, OPP and PCB were all ***below*** the analytical limit of detection. The analysis revealed the presence of benzene above analytical detection limits in two samples, M-2 (1.0 µg/L) and M-7 (1.1 µg/L). These detections were below the NEPM EIL (2013) and ANZECC (2000) criteria values of 950 µg/L.

A number of exceedances for metals were recorded in the groundwater samples. The concentrations of Cd (1.3 µg/L), Cu (4 µg/L), Ni (20 µg/L) and Zn (67 µg/L) in monitoring well M-2 were found to exceed the respective NEPM (2013) EIL assessment criteria values of 0.2 µg/L, 1.4 µg/L, 11 µg/L and 8 µg/L, respectively. Zinc was also found to exceed the EIL criteria in M-3 (21 µg/L) and M-5 (18 µg/L), whilst copper in M-3 (2 µg/L) and nickel in M-6 (13 µg/L) and M-7 (12 µg/L) also exceeded the criteria. These results are not considered to represent a significant environmental risk.

The detection of metal levels above the NEPM EIL freshwater assessment criteria may be a reflection of natural conditions or may reflect the presence of contaminated material similar to that identified in the surface material from within the kilns, which contained higher concentrations of cadmium and zinc. However, it is recommended that further monitoring should be conducted to determine the long-term trend for these metals.

Furthermore, it is recommended that additional sampling and analysis of the surface and groundwater be conducted, particularly to confirm the presence of benzene in monitoring wells M-2 and M-7. This is considered important, as benzene was not reported in any soil samples and its presence in the groundwater will require further investigation to enable a better understanding of the possible

source(s). It is also recommended that another two wells are constructed down gradient of the identified UST (AEC-7 in the Soil Assessment Report) during the investigation, decommission and removal works.

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1. INTRODUCTION

1.1 Preamble

Land Development Authority (LDA) engaged SMEC Australia Pty Ltd (SMEC) to conduct a Site Investigation (SI) for land parcels comprising the former Canberra Brickworks (the Site), located at Denman Street Yarralumla, ACT. The present investigation was conducted to provide LDA with information on the locations and concentrations of a number of targeted contaminants in soil and groundwater and the lateral and vertical extent of fill material. The information obtained from this investigation will provide a better understanding of the current status of the site and form the basis for a more detailed and targeted detailed site investigation, if required.

1.2 Previous Work

This addendum report compliments the main report 'Canberra Brickworks Site Investigation' submitted to LDA 26 October 2016, as agreed by the auditor (L. Jorstad).

1.3 Objectives

The activities of the groundwater and surface water investigation were conducted as part of the overall site investigation by SMEC between 5 September and 17 October 2016. The objective of the water component of the site investigation was to provide a baseline on the quality of water below the Site to enable an understanding of underlying conditions and make a determination about the suitability of the Site and associated conditions for the proposed end use.

1.4 Scope of Works

To meet the requirements of the SAQP, the following scope of work was undertaken:

- Installation of eight groundwater monitoring wells to a maximum depth of 15.0 m bgl or until refusal
- Development and purging of the wells
- Sampling and analysis for Contaminants of Potential Concern (CoPC)
- Comparison of results against assessment criteria to determine level of risk
- Compilation of this addendum report detailing results and implications.

1.5 Legislative Framework

The overall investigation will be undertaken in general accordance with the following ACT EPA endorsed legislation and guidance

- ACT Government, *Environment Protection Act* (1997)
- ACT Government, *Environment Protection Regulation* (2005)
- ACT EPA, *Contaminated Sites Environmental Protection Policy* (2009)

1.6 Environmental Standards and Guidelines

This report was prepared in general accordance with the requirements of the guidelines endorsed by the ACT Environment Protection Authority (EPA) which includes the following:

- ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*

- National Environment Protection Council National Environment Protection (*Assessment of Site Contamination*) Measure (1999, amended 2013) Schedule B(1) *Guideline on Investigation Levels for Soil and Groundwater*
- National Environment Protection Council National Environment Protection (*Assessment of Site Contamination*) Measure (1999, amended 2013) Schedule B(5a) *Ecological Risk Assessment*

1.7 Report Limitations

This report was based on the Scope of Work outlined in Section 1.4. SMEC prepared this report in a manner consistent with the normal level of care and expertise exercised by members of the environmental profession.

This report relates only to the objectives stated and does not relate to any other work undertaken for the Client. Site conditions upon which inferences in this report are drawn may change with time and space. The absence of any identified hazardous or toxic materials on the subject property should not be interpreted as a guarantee that such materials do not exist on the Site.

All conclusions regarding the property area are the professional opinions of SMEC, subject to the qualifications in the report. While normal assessments of data reliability have been made, SMEC assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of SMEC, or developments resulting from situations outside the scope of this project.

The client acknowledges that this report is for the exclusive use of Land Development Authority.

2. SITE CHARACTERISTICS

Details pertaining to the characteristics of the site are detailed in the main report *Canberra Brickworks Site Investigation*, Yarralumla, ACT, dated 24 October 2016. The topics discussed below only pertain to the groundwater and their potential influence.

2.1 Geology

The *Geology of Canberra 1:100, 000 Sheet 8287* (1992) shows that the Canberra brickworks is underlain by calcareous and tuffaceous mudstone and siltstone of the Late Silurian Yarralumla Formation. The formation outcrops within and adjacent to the pit area of the site.

2.2 Regional Hydrology and Hydrogeology

Review of the *1:100,000 Hydrology of the Australian Capital Territory and Environs* (1984) indicated that the groundwater beneath the Site is generally present in fractured rock. The quality tends to be variable and was described as 500 - 1,000 mg/l TDS. The yield was described as approximately 1.0 l/s.

A search of the Environment and Sustainable Development Department (ESDD) Groundwater Bore database indicated that three registered abstraction and one investigation/monitoring groundwater were located within a 2 km radius of the Site. The details of the registered groundwater bores is presented in Table 2.1. No registered groundwater bores were located within the Site.

Table 2.1 Groundwater Bore Survey Details

Bore ID	Purpose	Construction Date	Depth (m)	Water Level
WU36	PRIVATE	Unknown	43	35
WU105	PRIVATE	Unknown		
WU609	PRIVATE	Unknown		
WODEN 3	PRIVATE	Unknown		

2.3 Contaminants of Potential Concern

Based on the Site history and background data review, SMEC (in conjunction with the SAQP prepared by AECOM) have identified the following CoPC that may be present in the groundwater and surface water at the site.

Table 2.2 Contaminants of Potential Concern

CoPC	Context
Organochlorine Pesticides (OCP), Organophosphorus Pesticides (OPP)	OCPs / OPPs are persistent and bio-accumulative in the environment. They were formerly used as pest control for crops, livestock and buildings. As the site was historically used for grazing, there may be OCP / OPPs present in the surface and groundwater
Heavy metals	May be present on Site as a result of historical industrial activity or in imported fill. Some elevated background levels of metals are also known to be present naturally in the environment. There is potential that previous site activities including the Brickworks itself, may have resulted in metals being present of Site.

Total Recoverable Hydrocarbons, benzene, toluene, ethylbenzene, xylene (BTEX)	There are a number of potential sources of hydrocarbon contamination used over the years including heating oil, oils and greases, TRH (BTEXN) associated with the use of fuels and lubricants and former UST are potentially present. In addition, there is also potential for hydrocarbons to be present in imported fill.
Polycyclic Aromatic Hydrocarbons (PAH), Phenols	Derived from partially combusted organic materials, also from coal used as fuel in the kilns and ash buried across the site. May have potentially leached into the groundwater. There is also potential for PAHs and phenols to be present in any imported fill present at the Site.
Polychlorinated biphenyls (PCB)	May be associated with buried wastes from buildings and potential transformers and associated oils as well as imported fill.

3. METHOD

3.1 Rationale

The location and depth of the groundwater monitoring wells was initially determined as part of the SAQP developed by AECOM (2016). The rationale for the number, depth and location of the monitoring wells was based on targeted/judgemental approach to characterise site boundary conditions.

The monitoring wells were initially planned to be installed to a maximum depth of 15 m, in accordance with agreement with the Auditor. The final depth for the wells varied due to the ground conditions and actual depth of groundwater. The groundwater monitoring wells were augered until refusal. Where refusal was encountered the method changed to wash boring to continue to the prescribed depth.

Where groundwater was encountered using the augering, the screen casing, sand filter pack and bentonite were installed. Sand was placed around the casing to 1m below ground level as groundwater would move through the sand filter pack. The bentonite was placed from 1m below ground surface to surface level.

The wells were then concreted off at the base and monuments installed. As a result of the variable groundwater depth encountered during the well drilling, the final depth of each well differed from the original scoped depth of 15 m. The location of the monitoring wells was subsequently surveyed by licensed surveyor LANDdata Surveys on 14 October 2016. The information and location of each well wells and the surface water sampling locations is shown in **Figure 1, Appendix A.**

3.2 Monitoring Well Construction

Eight groundwater monitoring wells were installed across the site by GE Drilling, the locations of which are shown in Figure 1.

- Monitoring wells were installed to depths between 5.5-15 m bgl
- Wells were constructed when using augering following encountering groundwater
- Screening of wells was conducted through the installation of 0.4 mm slotted µPVC tubing across a 3 m length
- Following initial installation, monitoring wells were left for a period of one to three days before development
- Following development, wells were left for a period of seven days before purging and sampling
- Following completion, the location of each monitoring well was recorded by GPS and a monument was installed on each well.

The thickness of the sand pack in each well was determined by the measured depth to groundwater (where applicable). In the wells where wash-boring was used, the thickness of the sand pack was increased due to the inability to accurately determine the depth to groundwater. This was a conservative approach which resulted in the sand pack being up to 14 m thick for M-2, M-6, M-7 and M-8 which included the portion around the well screen. The use of a larger sand pack in the wells also provided a level of hydraulic connectivity with the groundwater which served to compensate for the possible screening across the incorrect interval in wells where wash-boring was used. There were no water bearing zones encountered while drilling through fill material, weathered rock and rock. Wash boring commenced on refusal of conventional drilling mechanisms. Striking of groundwater through wash boring could not be determined hence the 3m screen was used at the bottom of each well with the sand filter pack being up to 14m to allow for groundwater infiltration. The standing water level was only determined during well development and sampling.

3.3 Groundwater Well Development

Following construction, the monitoring wells were developed and volumes calculated using the equation below for each of the monitoring wells:

$$\text{Bore volume} = \pi r^2 h \ (m^3)$$

Where;

r = well radius (half diameter) in metres

h = height of water column = TD - SWL

The volume of water removed from each well for development ranged between 3.9 L (M-3) to 25 L (M-2). Water quality parameters were not measured during the development stage.

The well development sheet, including volumes removed, is provided in Appendix F.

3.1.1 Standing Water Levels

Groundwater depths following development ranged between 1.198-10.547 m bTOC with the exception of wells M-1 and M-8 which were dry. The standing water levels in the deeper monitoring wells M-2 (573.31 m AHD), M6 (571.70 m AHD) and M-7 (573.88 m AHD) appear to have similar elevations, suggesting there may be a degree of connectivity between these points. The difference in SWL in the shallow wells M-3 (574.67 m AHD), M4 (576.75 m AHD) and M-5 (582.86 m AHD) is greater than observed in the deeper wells. Water levels in shallow groundwater systems tend to mimic topography which can be seen in this instance. Bedrock outcrops in the vicinity of M-5, exhibiting strong folding and bedding planes, with commensurate fracturing, providing preferential pathways for penetration of water from the surface.

The depth of the monitoring wells and screening range is provided in Table 3.1. Well construction logs are provided in **Appendix B**.

Table 3.1 Groundwater Monitoring Well Data

Monitoring Well	Date Installed	Depth of well (m)	Screen Depth (m)	Well Elevation (ToC m AHD)	Standing Water Level (m AHD)	Depth to Groundwater (m TOC)
M1	15-22/09/2016	8.5	5.5-8.5	582.78	N.A.	N.D. (dry)
M2	13-14/09/2016	15	12-15	577.40	573.31	4.091
M3	13/09/2016	5.5	1.0-4.0	577.61	574.67	2.741
M4	22/09/2016	4.0	1.0-4.0	577.95	576.75	1.198
M5	15/09/2016	5.5	2.5-5.5	584.82	582.86	1.965
M6	14/09/2016	15	12-15	585.25	571.70	10.547
M7	21-22/09/2016	14.7	11.7-14.7	582.44	573.88	8.565
M8	21/09/2016	15	12-15	587.43	N.A.	N.D. (dry)

3.4 Groundwater Sampling

Groundwater sampling was conducted over the period 28 September to 17 October 2016. The delays in completing the sampling within the initial proposed sampling timeframe was due to breakdown of the drilling equipment. This resulted in the monitoring wells be installed over a longer period of time than originally anticipated.

The depth to groundwater (standing water level to top of the casing) was measured using an interface probe. The total depth of the well was measured at the same time.

Purging of all the wells was undertaken using new bailers at each location.

A bladder pump was used for the collection of the groundwater samples in all the wells due to the depth (up to 15 metres) of some of the wells. Samples were collected directly into laboratory prepared plastic and glass bottle containers. Filtering of the groundwater samples for metals was undertaken by the laboratory.

Preservatives were in sample bottles used for total Phenols (H_2SO_4) and the 2 x 40 ml vials for BTEXN (sodium thiosulfate, $NaSO_3$). No preservatives were used in sample bottles used for the collection of water samples requiring laboratory filtering and subsequent analysis for heavy metals. These samples were collected in acid washed bottles.

Water quality parameters (pH, Redox, dissolved oxygen, conductivity, temperature) were measured in the field using a multi-probe water quality meter. The following criteria were used to determine when the water quality parameters had stabilised and ready for sample collection:

	pH	EC (µS/cm)	Redox (mV)	DO (ppm)	Temperature (°C)
Acceptable Variation	+/- 0.1	+/-10%	+/-10%	+/-10%	+/- 0.5

None of the wells that could be sampled (i.e. with the exception of M-1 and M-8), purged dry prior to groundwater sampling. The groundwater sampling sheets are attached in **Appendix F**.

3.5 Surface Water

Three surface water samples were collected on 22 September 2016 from the ephemeral water body in the Pit area. The water body is present within an excavation within the bedrock which was dug to accommodate a model railway line and associated 'lake'. Water quality parameters mere measured in the field at the time of collection using a multi probe water quality meter. There was free standing water in this body at the time of sampling, which was up to approximately 1 m deep. There was also abundant vegetation and wildlife in the water body, including frogs and birds.

The edges of the water body contained abundant vegetation and minor algae whilst the main part of the water body appeared relatively clean. The hydraulic connectivity between the water body and the surrounding ground, including fill material was not readily identifiable due to the folded and fractured nature of the bedrock and variable thickness of fill material. The location of the surface water samples is shown in **Figure 1, Appendix A.**

3.6 Implications and Limitations

The use of wash boring as the method for drilling the deeper monitoring wells introduces a number implications for the sampling and analysis of the groundwater. Firstly, there is a potential for water introduced into the system during the initial installation of the wells to influence the physico-chemical parameters of the groundwater, such as conductivity and also introduce contaminants.

The use of extended sand packs in the wells due to t eh inability to identify the groundwater levels during construction and installation may also affect the initial measurements of groundwater depth as the wells may not have attained equilibrium between development and sampling. As such, data from further sampling may resolve this issue. Further sampling may also resolve the potential impacts resulting from wash-boring, as any residual water may be flushed out of the system over a period of time.

4. QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance (QA) is defined as the planning process and systematic actions undertaken to ensure the representativeness of a field sampling event. These processes are assessed against the Quality Controls (QC) which measures the success of the QA procedures against the data quality indicators (DQI).

The field and laboratory QA/QC, DQIs and data acceptability have been adopted from the ASC NEPM 2013. A review of the field and laboratory QA/QC performance is provided below.

Table 4.1 QA/QC Protocols and Specifications

Field DQI	Comment
Use of a suitably qualified and experienced samplers	The inspection and sampling activities were undertaken by SMEC Environmental Scientists Ryan O'Leary between 28 September and 17 October 2016
Appropriate decontamination of reusable equipment and use of blank (field and rinsate) samples	The groundwater monitoring equipment which was placed down the monitoring well (dip-meter/interface probe and all other equipment) was decontaminated before use at each location using Decon 90. No rinsate samples were collected. Given that the equipment was decontaminated appropriately this is deemed sufficient.
Fresh nitrile glove use between each sample	Soil samples were collected using a new disposable nitrile glove for each sample, to avoid risks from cross-contamination
Standard operating procedures and field documentation used	All field activities were undertaken in accordance with SMEC practices and ACT EPA approved guidelines
Samples kept under completed Chain of Custody (CoC) documentation	Samples were recorded and kept under a signed COC until receipt by the laboratory. A copy of the signed CoC is attached in **Appendix D**.
Collection of field split samples at the appropriate rate for duplicate 1:20 and triplicate 1:20	One intra-laboratory replicate samples and one inter-laboratory samples were analysed during the works. This constitutes a duplicate sample ratio of 1:9 and a triplicate sample ratio of 1:9.
Calibration of field equipment	Calibration certificates for the dip-meter/interface probe and water quality meter are provided in **Appendix E**. Calibration of the water quality meter probe was undertaken using the pH 4.0 calibration solution provided by ThermoFisher Scientific.
Use of laboratory prepared trip spike for volatile analysis	No trip spike samples were used during this investigation.
Use of laboratory prepared trip blank for volatile analysis	No trip blank samples were used during this investigation.
Laboratory DQI	**Comment**
Appropriate laboratory supplied containers and preservatives used Samples received in a good condition	All samples were received in appropriately pre-treated and preserved containers.
Samples extracted within holding time	All samples were extracted within the relevant holding time for the CoPC

Field DQI	Comment
Laboratory accreditation and analytical methods used	SGS (primary) and ALAS (secondary) are NATA accredited laboratories for the analysis of the required CoPC. The analytical methods used are described in the attached laboratory certificate in **Appendix D**.
Laboratory Limit of Reporting (LOR) to be less than the assessment criteria	The LOR is less than the adopted assessment criteria.
Relative percent differences (RPDs) within the acceptable ranges. Acceptable RPDs: 80% (1-10 x LOR), 50% (10-30 x LOR) and 30% (>30 x LOR) Laboratory Control Spike (LCS) analysis at a rate of 1:20, recoveries to be within 70-130% Matrix Spike Recoveries (MSR) analysis at a rate of 1:20, recoveries to be within 70-130%	A review of the laboratory quality control report indicated that the rates and recoveries of the laboratory QC samples met the DQIs. A copy of the Laboratory Quality Control Report and Interpretive Quality Control Report is attached in **Appendix D**.
Method Blank (MB) samples to less than the laboratory detection limit	
Surrogate Recoveries (SR) to be within 70-130% Laboratory duplicate samples analysis at one per process batch, or two if the process batch exceeds 10 samples	

4.1 QA/QC Summary

A review of the QA data from the laboratory indicated that the requirements detailed in AS4482.1 (2005) and NEPM (2013) Schedule B (2) were generally met. A summary of the main points from the QA/QC procedure is detailed below.

- Samples were received within appropriate holding times
- Samples were received in appropriate containers and chilled
- The number of duplicate samples (1) met the sampling requirement of 1:20
- The number of inter-laboratory triplicate samples (1) met the requirement of 1:20
- No trip spike samples were analysed for the investigation. This **did not** meet the requirement of one per day
- No trip blank samples were analysed for the investigation. This **did not** meet the requirement of one per day
- RPD between primary and duplicate samples and primary and triplicate was between 4-11%
- Laboratory surrogate samples were within the required range of 70-130%
- Laboratory internal duplicate samples were acceptable
- Laboratory matrix spikes generally met the recovery value of 70-130%
- Laboratory LOR was less than the assessment criteria for all CoPC

- The groundwater monitoring equipment which was placed down the monitoring well (dip-meter/interface probe and all other equipment) was decontaminated before use at each location using Decon 90.

The lack of trip blank and trip spike samples may have resulted in under-stating the concentration of benzene in the groundwater as the detected levels were marginally above the analytical detection limit of 0.5µg/L. The overall impact is considered to be low as the reported concentration was well below the relevant ecological/environmental screening levels and the potential for extraction of groundwater for potable use is minimal due to mains water being supplied to residential settings.

In summary, the data from the analysis of water samples is considered suitable for use.

5. RESULTS

The results from the field measurement of physico-chemical water quality parameters for surface water and groundwater and the analytical results from both are detailed below. Two wells were found to be dry (M-1 and M-8) at the time of sampling.

5.1 Field Parameters

5.1.1 Surface Water

Three surface water samples were collected on 22 September 2016, from the quarry portion of the Site. The physical conditions of the water at sampling was generally quite clear, with small amount of sediment/turbidity. The condition of the water body in the vicinity of the sampling locations was observed to contain a range of water plants with minor algae and fauna also present. The water quality parameters measured upon collection are shown in Table 5.1.

Table 5.1 Surface Water Quality Parameters

Surface Water	Date	pH	Conductivity (µS/cm)	DO (ppm)	Redox (mV)
W-1	22/09/2016	3.99	166	7.9	344
W-2	22/09/2016	3.97	93.3	7.97	320
W-3	22/09/2016	3.96	115	8.19	296

The results from the field measurements indicated that the surface water was relatively acidic, with pH being relatively constant, ranging between 3.96-3.99. The water was well oxygenated (DO 7.9-8.19 ppm) and quite fresh, with conductivity between 93.3-166 µS/cm.

5.1.2 Groundwater

Groundwater wells were installed between 13 and 22 September 2016. The wells were surveyed and the measurement between the survey height and the top of casing was subsequently conducted resulting in an accurate determination of the total height to top of casing. The data showing well installation date, elevation of the top of casing, well depths and standing water levels are presented in Table 5.2.

Table 5.2 Groundwater Wells: Installation and Development

Well	Date Installed	Elevation (m AHD)[1]	Standing Water Level (m AHD)	SWL (m bTOC)	Water Volume Removed During Development (L)	Comments
M-1	15-22/09/2016	582.78	N.A.	0	-	Dry
M-2	13-14/09/2016	577.40	573.31	4.091	25	-
M-3	13/09/2016	577.61	574.67	2.741	3.9	-
M-4	22/09/2016	577.95	576.75	1.198	7.1	-
M-5	15/09/2016	584.82	582.86	1.965	5.7	-
M-6	14/09/2016	585.25	571.70	10.547	10.1	-
M-7	21-22/09/2016	582.44	573.88	8.565	12.8	-
M-8	21/09/2016	587.43	572.33	15.096	-	Dry
1. ToC elevation determined after measurement of casing above ground and surveying of well						

The groundwater elevation was found to vary quite markedly across the site, from 571.70 m AHD (M-6) to 582.86 m AHD (M-5).

Following completion, the wells were sampled between 28 September and 17 October 2016. Two wells were found to be dry following development. No groundwater was encountered in these wells pre-development. The driller thought he had encountered groundwater at M1 and wash boring occurred at M8. This was despite there being prolonged periods of rainfall between 22-29 September when 66.2 mm of rainfall was recorded. The absence of water in M-1 may be due to the nature of the sub-surface conditions, including the degree of fracturing and/or folding which may influence the permeability of the bedrock and hence transmissivity of groundwater.

The variability in depth to groundwater and the underlying geology may also exert an influence on the groundwater flow direction. An initial assessment of flow direction indicated that groundwater may flow to the south-east, based on the measured groundwater elevation. The variability in ground conditions and measured depth to groundwater across the site suggests that the connectivity between wells may be restricted or not be present and that depth to groundwater is reflective of ground conditions in the immediate vicinity of the monitoring wells.

The results showed that there was an appreciable difference in pH between the surface water samples and those from the groundwater which all ranged between 6.50 and 6.99, except for one being M-3 which had a pH of 5.95. The temperature of the groundwater also exhibited a range of almost 6°C, with measured temperatures ranging from 14.4°C (M-5) to 20°C (M-7). The water was purged into a plastic measuring cup and the temperature taken using probes. The temperature variation may reflect the ambient air temperature during purging (hotter during midday and cooler in morning and late afternoon). The physico-chemical parameters are presented in Table 5.3.

Table 5.3 Groundwater Quality Parameters

Well	Date Sampled	pH	Conductivity (µS/cm)	DO (ppm)	Redox (mV)	T (°C)	Comment
M-1	17/10/2016	n.d.	n.d.	n.d.	n.d.	n.d.	Dry
M-2	28/09/2016	6.89	1923	2.25	94	18.9	-
M-3	28/09/2016	5.94	887	9.17	142	16.6	-
M-4	17/10/2016	6.60	633	2.94	115	15.5	-
M-5	17/10/2016	6.99	440	2.89	96	14.4	-
M-6	17/10/2016	6.91	2250	5.30	129	15.2	-
M-7	17/10/2016	6.50	455	7.83	136	20	-
M-8	17/10/2016	n.d.	n.d.	n.d.	n.d.	n.d.	Dry

The oxygenation of the groundwater varied, with dissolved oxygen concentrations between 2.25 ppm (M-2) to 9.17 ppm (M-3). The redox potential was relatively stable between wells, ranging between 94 mV (M-2) to 142 mV (M-3). The conductivity exhibited a larger range, with results between 440 µS/cm (M-5) to 2, 250 µS/cm (M-6).

The variability in conductivity recorded in the monitoring wells may be due to the presence of dissolved material in the vicinity of individual wells. The lowest conductivities were measured in M-5 (440 mV) and M-7 (455 mV), located in the northern corner and southern portion of the site, respectively. There does not appear to be an observable correlation between any of the measured parameters or with depth to groundwater. The slightly lower conductivity data from the shallower monitoring wells M-3, M-4 and M-5 may be due to infiltration of surface water, which would serve to dilute any water which may have higher conductivity.

The EC for M-7 is considerably lower than the comparative deeper wells (M-2 and M-6). This may be due to the fact that M-7 was installed in clean soil with no fill whereas M-2 and M-6 contained fill material to 3m and 1.5m, respectively. This may have influenced the resultant conductivity measurement. The variability in the measured conductivity between the deeper wells may also be a reflection of the initial drilling and installation and it is recommended that the conductivity be measured during future sampling

events to determine whether the method of installation (wash boring) had an influence on the measured conductivity.

The presence of trace amounts of metals is not considered to influence the measured conductivity. The observed conductivity may also be due to the presence of other substance(s) within the water column that were not included in the CoPC. Should a similar range be measured in a future sampling event, it is suggested that total dissolved solids (TDS) be included in the analytical suite to provide information on the potential reasons for the variability in conductivity.

In future if conductivity results are similar to those measured in the initial sampling round, analysis of major ions should be considered to provide more information on the water chemistry. This information could be plotted on a Piper or Durov diagram to identify any possible differences or similarities.

5.2 Analytical Results

5.2.1 Surface Water

The results from the surface water samples indicated that BTEXN, TRH, PAH, OPP, OCP and PCB were ***below*** analytical detection limits. Of the metals, only zinc in W-2 (25 µg/L) and W-3 (22 µg/L) was found to exceed the NEPM (2013) screening criteria for fresh water. All other metals were either ***below*** detection limits or ***below*** assessment criteria.

5.2.2 Groundwater

The analytical results for the groundwater indicated that several of the COPC, namely TRH, PAH, OCP, OPP and PCB were all ***below*** the analytical limit of detection. The analysis revealed the presence of benzene above analytical detection limits in two samples, M-2 (1.0 µg/L) and M-7 (1.1 µg/L). These detections were below the NEPM EIL (2013) and ANZECC (2000) criteria values of 950 µg/L. The benzene concentration in M-2 was above the drinking water guideline value of 1.0 µg/L. The Australian Drinking Water Guidelines were not applicable as the groundwater is not extracted for consumption as potable water is supplied by mains.

The identification of metals in the groundwater samples may be a reflection of the variability in the type and thickness of fill material in the vicinity of each well. The reported presence of elevated levels of cadmium, zinc and chromium in surface samples may be responsible for the observed presence in the groundwater if similar impacted material was buried in the areas in the vicinity of the monitoring wells. These elements exhibit higher solubility than lead compounds which may also explain why lead was not reported in the groundwater samples. Heavy metals exceedances are summarised in Table 5.4.

Table 5.4 Heavy Metal Exceedances in Groundwater

Monitoring Well	Cd	Cu	Ni	Zn
NEPM (2013) criteria[1]	**0.2**	**1.4**	**11**	**8**
M-2	1.3	4	20	67
M-3	-	-	-	21
M-5	-	2	-	18
M-6	-	-	13	-
M-7	-	-	12	-

All units in µg/L
1. Criteria for fresh water

Other possible reasons for the presence of heavy metals in the groundwater may be evidence of leachate from the adjacent asbestos dump or a reflection of the local geology. There is potential for

metals to be associated with the asbestos dump, however this cannot be confirmed as the current investigation did not include the dump area.

The presence of benzene in M-2 (1.0 µg/L) and M-7 (1.1 µg/L) is somewhat unusual as there was no benzene detected in any surface soil sample or any other monitoring well, however it is noted that both these locations are down gradient of the identified UST further north. There are no other obvious sources of benzene. Alternatively, the presence of benzene at concentrations marginally above the analytical detection limit may be a result of contamination within the analysing laboratory. The presence of benzene is an issue that will require further groundwater sampling to develop a better understanding of the potential source(s) of this CoPC.

6. DISCUSSION AND CONCLUSIONS

The investigation of groundwater quality at the Site indicated that the presence of COPC was limited to benzene and metals. Metals are naturally occurring substances and their presence in groundwater (and soil) is ubiquitous. The presence of metals cadmium, copper, nickel and zinc may be a reflection of the underlying geology or may also include an anthropogenic component. At this point, it is not possible to identify a particular source for the identified metals.

6.1 Rainfall

Three periods of high rainfall occurred during the well installation which may have influenced the observed results. Rainfall data from Bureau of Meteorology for Parliament House, the nearest meteorological station, revealed that 66.2 mm rainfall occurred:

- 22 September: 22.2 mm
- 29 September: 19.8 mm
- 30 September: 24.2 mm

Given that the observed ground conditions were quite porous due to the underlying fill material and the relatively fractured bedrock, the elevated rainfall may have leached some metals from the material, or transported from further afield, resulting in the observed concentrations in the groundwater.

The results for surface water, particularly the physico-chemical parameter pH, exhibited appreciable difference with the groundwater results. This may be due to the presence of organic acids derived from decayed vegetation contributing to the observed pH in the surface water. The surface waters samples were collected from the edges of the water body, where the potential for organic matter to influence the measured pH may be greater than in deeper parts of the water body.

The absence of water in groundwater well M-1 was unusual, given that elevation of this well (582.6 m) is lower than other wells in which groundwater was present, such as M-5 and M-6 (elevation 584 m). The absence of water in this well may be due to the underlying geology, which exhibits folding and fracturing in outcrop.

The connectivity of groundwater between the monitoring wells has not been confirmed. The variability in the thickness of fill material across the site coupled with the folded and fractured nature of the underlying bedrock may exert an influence on the presence/absence of groundwater in each well. A similar explanation may account for the absence of groundwater in monitoring wells particularly M-1 which is located in the Pit area. The absence of groundwater in monitoring well M-8 may be due to the location at the highest elevation of any of the wells (586.70 m AHD) and in ground with no identified fill material.

The identification of benzene in M-2 and M-7 was not considered to have appreciable implications for the nearest registered groundwater bores. A potential source for the benzene may be the former UST uncovered during the site investigation. No information was available to determine the substance stored within the UST. Therefore it is suggested that further sampling and investigation be conducted to allow assessment of the potential sources and implications arising from the identification of this CoPC. It is also recommended that total dissolved solids (TDS) be included in the analytical suite to provide information on the potential reasons for the variability in conductivity identified between wells.

6.2 Conclusions

Land Development Agency (LDA) commissioned Snowy Mountains Engineering Corporation (SMEC) to conduct an environmental site investigation of the Canberra Brickworks to determine the extent and quantity of contamination present at the site. The works involved examination of soil, surface and groundwater.

The examination of groundwater involved installation of eight groundwater monitoring wells across the site, which were installed between 13 and 22 September 2016. Wells were installed to depths between 4.575 m bgl and 15.670 m bgl. Surface water samples were collected on 22 September and groundwater samples collected between 28 September and 17 October 2016.

Surface water was present as an ephemeral water body in the Pit area at the time of sampling. Depth to groundwater ranged between 1.198 m bTOC (M-4) to 10.547 m bTOC (M-6). Groundwater was not recorded in two wells (M-1 and M-8).

The results of the physico-chemical parameters showed that there was an appreciable difference in pH between the surface water samples (3.96-3.99) and those from the groundwater (5.94 and 6.99). The difference in measured pH between the surface water and groundwater samples may be the result of the influence of organic acids derived from the breakdown of organic matter in the surface water body. Other possible factors which may account for the observed difference may include the potential for buffering and control of groundwater pH from the fill material and bedrock.

Other parameters, such as dissolved oxygen and redox potential indicated that both surface water and groundwater were relatively well oxygenated. The temperature of the groundwater exhibited a range of almost 6°C, from 14.4°C (M-5) to 20°C (M-7).

The analytical results for surface water samples indicated that BTEXN, TRH, PAH, OPP, OCP and PCB were below analytical detection limits. Of the metals, only zinc in W-2 (25 µg/L) and W-3 (22 µg/L) was found to exceed the NEPM EIL (amended 2013) screening criteria for fresh water. All other metals were either ***below*** detection limits or ***below*** the relevant assessment criteria.

The analytical results for the groundwater indicated that several of the COPC, namely TRH, PAH, OCP, OPP and PCB were all ***below*** the analytical limit of detection. The analysis revealed the presence of benzene above analytical detection limits in two samples, M-2 (1.0 µg/L) and M-7 (1.1 µg/L). These detections were below the NEPM EIL (2013) and ANZECC (2000) criteria values of 950 µg/L.

A number of exceedances for metals were recorded in the groundwater samples. The concentrations of Cd (1.3 µg/L), Cu (4 µg/L), Ni (20 µg/L) and Zn (67 µg/L) in monitoring well M-2 were found to exceed the respective NEPM (2013) EIL assessment criteria values of 0.2 µg/L, 1.4 µg/L, 11 µg/L and 8 µg/L, respectively. Zinc was also found to exceed the EIL criteria in M-3 (21 µg/L) and M-5 (18 µg/L), whilst copper in M-3 (2 µg/L) and nickel in M-6 (13 µg/L) and M-7 (12 µg/L) also exceeded the criteria. These results are not considered to represent a significant environmental risk.

The detection of metal levels above the NEPM EIL freshwater assessment criteria may be a reflection of natural conditions or may reflect the presence of contaminated material similar to that identified in the surface material from within the kilns, which contained higher concentrations of cadmium and zinc. However, it is recommended that further monitoring should be conducted to determine the long-term trend for these metals.

Furthermore, it is recommended that additional sampling and analysis of the surface and groundwater be conducted, particularly to confirm the presence of benzene in monitoring wells M-2 and M-7. This is considered important, as benzene was not reported in any soil samples and its presence in the groundwater will require further investigation to enable a better understanding of the possible source(s). It is also recommended that another two wells are constructed down gradient of the identified UST (AEC-7 in the Soil Assessment Report) during the investigation, decommission and removal works.

7. REFERENCES

ASRIS (2011) *Australian Soil Resource Information System* (http://www.asris.csiro.au/). Accessed 15 September 2016

ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Australian Standard AS4482.1 (2005) *Guide to the investigation and sampling of potentially contaminated soils: Part 1 – Non-volatile and semi volatile compounds*

Bureau of Mineral Resources (1992) *Geology of Canberra 1:100 000 Sheet 8287*

Evans WR (1984) *Hydrogeology of the Australian Capital Territory and Environs.* Bureau of Mineral Resources, Geology and Geophysics, Canberra

National Environment Protection Council (1999, amended 2013) National Environmental Protection Measures (NEMP) *Schedule B (1) Guideline Levels for Soil and Groundwater*

National Environment Protection Council (1999, amended 2013) National Environmental Protection Measures (NEMP) *Schedule B (5) Ecological Risk Assessment*

National Uniform Licensing Committee (2012) *Minimum Construction Requirements for Water Bores in Australia.* National Water Commission, Canberra

Western Australian Department Health (2009) Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia

APPENDIX A – FIGURES

Name	East	North	Elevation
MW01	207402.42	600814.72	582.06
MW02	207215.89	600856.34	576.68
MW03	207260.38	600959.09	576.92
MW04	207357.33	600936.32	577.21
MW05	207464.08	601018.08	584.12
MW06	207540.36	600892.46	584.57
MW07	207192.17	600731.83	581.76
MW08	207293.25	600651.5	586.7
W-1	0	0	598
W-2	0	0	617
W-3	0	0	589

FIG NO. 2

FIGURE TITLE Canberra Brickswork Sampling Plan Contamination

DATE 01/11/2016

0 25 50 100 Meters

1:3,485

PAGE SIZE A4

COORDINATE SYSTEM GDA 1994 MGA Zone 55

SMEC

PROJECT NO. 3002523

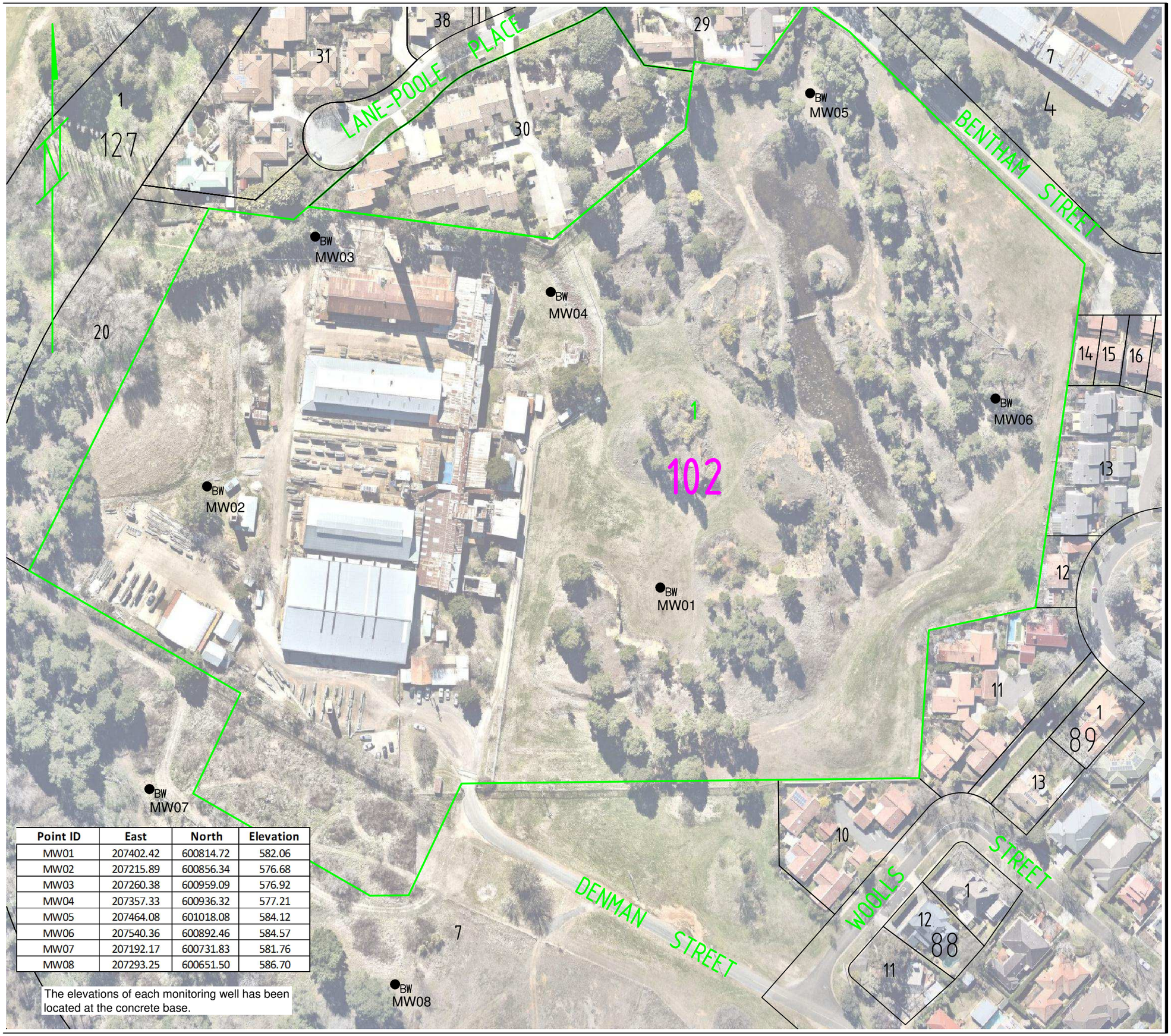
PROJECT TITLE Canberra Brickworks

SOURCES ACTMapi

CREATED BY N.Crook

Location: X:\PROJECT\3002523 Canberra Brickworks Phase 2 Contamination and Geotech\6 Delivery\6.2 Figures and Result Tables\6.2.1 GIS\Figure 2_Contam_Overall_010116 - New.mxd

Last updated by: AA10448 on 1/11/2016 at 12:17



Point ID	East	North	Elevation
MW01	207402.42	600814.72	582.06
MW02	207215.89	600856.34	576.68
MW03	207260.38	600959.09	576.92
MW04	207357.33	600936.32	577.21
MW05	207464.08	601018.08	584.12
MW06	207540.36	600892.46	584.57
MW07	207192.17	600731.83	581.76
MW08	207293.25	600651.50	586.70

The elevations of each monitoring well has been located at the concrete base.

CLIENT

SMEC AUSTRALIA PTY LTD

DISCLAIMER:
This plan of survey and its associated digital data was prepared under instruction to meet specification as agreed. This information should not be used or relied upon by any other party.

REVISION		DATE

For the purpose of this plan, the boundary information shown is from Actmap digital data base only. Boundaries have not been surveyed therefore further survey and marking of boundaries may be required.

The reduced levels in this survey are based on local datum derived through GPS connection to published survey control marks with Australian Height Datum values.

Contour Interval — Datum A.H.D

BM SR 863 — RL 589.512

Scale 0 50 100
1:1500

LANDdata SURVEYS
T: (02) 6202 7600
11-13 Lawry Place
MACQUARIE, ACT 2614

INCORPORATING :
WILLIAM L. BACKHOUSE
SURVEYORS, PLANNERS & DEVELOPMENT CONSULTANTS.
T: (02) 9634 2866
Suite 8, 38 Brookhollow Ave.,
Norwest Business Park
Baulkham Hills, NSW 2153

Surveyed	I Stewart	14/10/2016
Drawn	I Stewart	17/10/2016
Checked		
Approved		

Surveyor, Registered under the Surveyors Act 2007.

YARRALUMLA BRICKWORKS

PLAN SHOWING
LOCATION OF MONITORING WELLS
BLOCK 1, SECTION 102
DIVISION OF YARRALUMLA

Proj No. 10013.01 **Rev**

Sheet No. 1 of 1 — 10013.01_001.dwg

 A3

APPENDIX B – WELL CONSTRUCTION LOGS

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

HOLE No: M1
SHEET No: 1 of 1
PROJECT No:

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 8.5m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth		SUBSTANCE	Well Construction	OTHER OBSERVATIONS
Method	Support	Depth (m)	Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details Construction notes	Notes (Structure, origin, etc)
				FILL GRAVELLY CLAYEY SAND WITH SOME GRAVELS		
				BROWN TO YELLOW GRAVELLY CLAYEY SAND	Bentonite	
		1		LIGHT BROWN COARSE GRAVEL		
				LIGHT BROWN COARSE GRAVEL		
		2				
				BEDROCK (40%) 1- 10MM SANDY GRAVELS , LIGHT BROWN FINE GRAVEL		
		3			Filter Pack	
				BEDROCK (15%) 1- 5MM SANDY GRAVELS		
		4				
				BEDROCK GRAVELLY SAND (10%) COARSE 1-3MM IN DIAMETER, LIGHT BROWN FINE GRAVEL		
		5				
		6				
					Screen	
		7				
		8				
		9				

Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 15/09/2016
COMPLETED: 22/09/2016

LOGGED BY: RO
CHECKED BY: GO

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

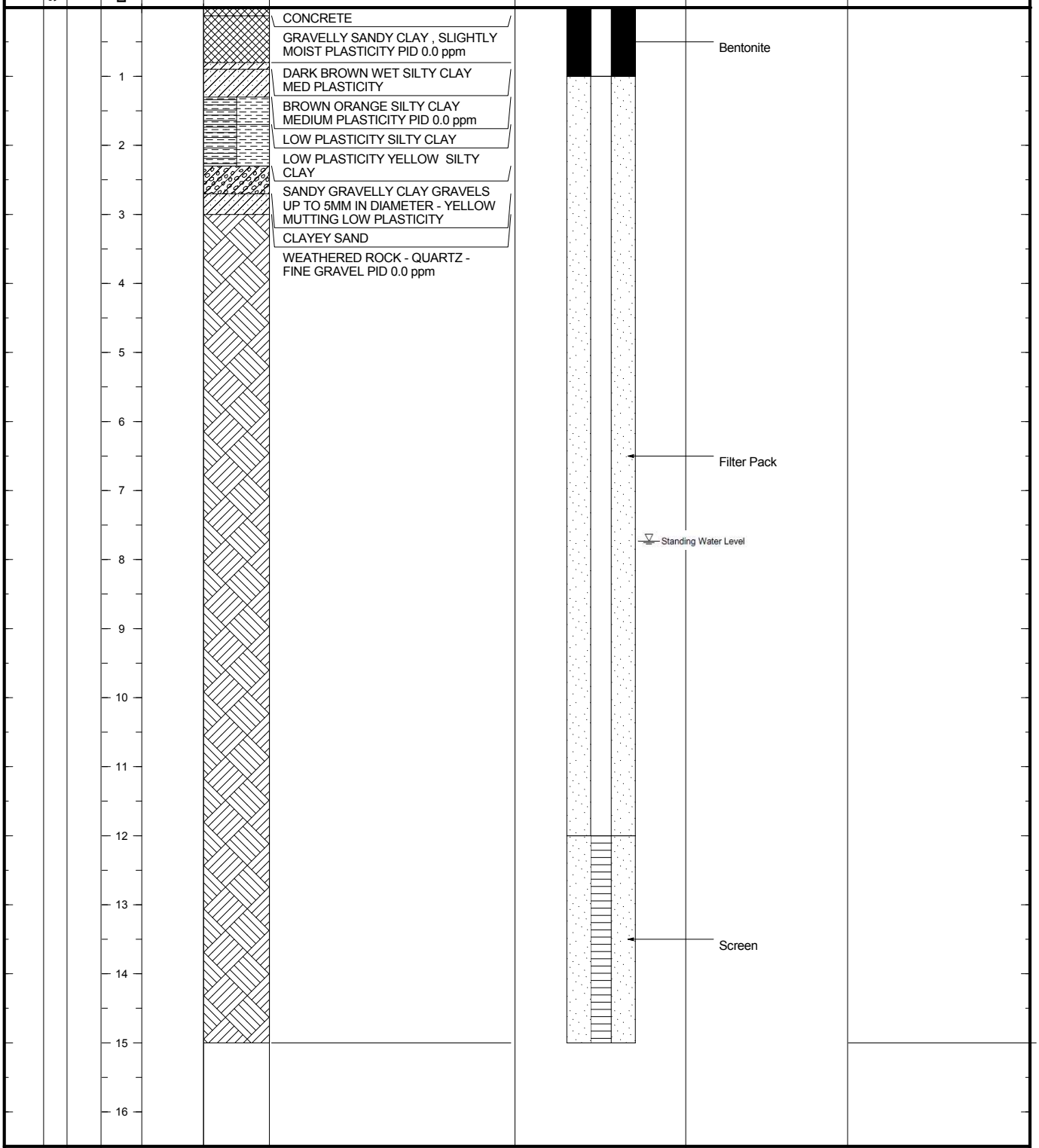
HOLE No:	**M2**
SHEET No:	1 of 1
PROJECT No:	

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 15m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth		SUBSTANCE		Well Construction	OTHER OBSERVATIONS
Method	Support	Depth (m)	Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details	Construction notes	Notes (Structure, origin, etc)



Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 13/09/2016
COMPLETED: 14/09/2016

LOGGED BY: RO
CHECKED BY: GO

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

HOLE No:	**M3**
SHEET No:	1 of 1
PROJECT No:	

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 5.5m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth		SUBSTANCE		Well Construction	OTHER OBSERVATIONS
Method	Support	Depth (m)	Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details	Construction notes	Notes (Structure, origin, etc)
				FILL TOPSOIL			
				GRAVELLY SANDY CLAY BRICKS CONCRETE PID 0.1 ppm		Bentonite	
		1		POORLY GRADED SANDY GRAVEL			
				SANDY CLAY YELLOW TO BROWN PID 0.0 ppm			
		2		WET CLAYEY SANDY GRAVEL		Screen	
				SANDY CLAY		Standing Water Level	
		3					
		4				Filter Pack	
				CLAYEY SAND YELLOW TO BROWN SOME ROCK FRAGMENTS			
		5					
		6					

Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 13/09/2016
COMPLETED: 13/09/2016

LOGGED BY: RO
CHECKED BY: GO

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

HOLE No:	**M4**
SHEET No:	1 of 1
PROJECT No:	

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 4m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth			SUBSTANCE	Well Construction		OTHER OBSERVATIONS
Method	Support	Depth (m)		Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details	Construction notes	Notes (Structure, origin, etc)
					Fill Grass cover , sandy clay wih gravels medium plasticity PID 0.0 ppm			
					Fill sandy clay with gravels 5-12mm , pieces of bolt in fill PID 0.0 ppm		Bentonite	
		1			Wet light brown clay PID 0.0 ppm			
		2					Standing Water Level	
		3					Screen	
		4						

Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 22/09/2016
COMPLETED: 22/09/2016

LOGGED BY: RO
CHECKED BY: GO

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

HOLE No:	**M5**
SHEET No:	1 of 1
PROJECT No:	

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 5.5m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth		SUBSTANCE	Well Construction	OTHER OBSERVATIONS
Method	Support	Depth (m)	Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details Construction notes	Notes (Structure, origin, etc)
				Fill - sandy gravelly light brown clay , some gravel PID 0.0 ppm		
				Fill - silty sandy clay , light brown medium plasticity PID 0.0 ppm	Bentonite	
		1		Siltstone rock , very fine medium soft light grey brown		
				Light grey limestone PID 0.0 ppm	Filter Pack	
		2		Siltstone , light brown, highly weathered , dry PID 0.0 ppm		
		3			Standing Water Level	
		4		Silty clay , brown moist, medium to high plasticity PID 0.0 ppm	Screen	
		5				
		6				

Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 15/09/2016
COMPLETED: 15/09/2016

LOGGED BY: RO
CHECKED BY: GO

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

HOLE No:	**M6**
SHEET No:	1 of 1
PROJECT No:	

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 15m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth		SUBSTANCE	Well Construction	OTHER OBSERVATIONS
Method	Support	Depth (m)	Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details Construction notes	Notes (Structure, origin, etc)
		0		Fill - gravelly sandy clay , gravels 1-5mm PID 0.8 ppm	Bentonite	
		1		Brown siltstone		
		2		Extremely weathered shale PID 0.1 ppm		
		3				
		4		Weathered siltstone , light brown PID 0.0 pppm		
		5				
		6		Layers of limestone , wash box from 5.5m	Filter Pack	
		7				
		8				
		9				
		10				
		11				
		12			Standing Water Level	
		13				
		14			Screen	
		15				
		16				

Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 14/09/2016
COMPLETED: 14/09/2016

LOGGED BY: RO
CHECKED BY: GO

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

HOLE No:	**M7**
SHEET No:	1 of 1
PROJECT No:	

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 15m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth		SUBSTANCE		Well Construction	OTHER OBSERVATIONS
Method	Support	Depth (m)	Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details	Construction notes	Notes (Structure, origin, etc)
		0		Orange brown , moist sandy clay medium plasticity PID 0.0 ppm		Bentonite	
		1		Brown silty sandy clay , moist medium plasticity PID 0.0 ppm			
		2		Rock			
		3					
		4					
		5					
		6				Filter Pack	
		7					
		8					
		9					
		10		Wash boring			
		11					
		12				Standing Water Level	
		13					
		14				Screen	
		15					
		16					

Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 21/09/2016
COMPLETED: 22/09/2016

LOGGED BY: RO
CHECKED BY: GO

GEOLOGICAL LOG OF GROUNDWATER BORE HOLE

HOLE No:	**M8**
SHEET No:	1 of 1
PROJECT No:	

PROJECT : 3002523
PURPOSE : Environmental
LOCATION :

CLIENT : Land Development Agency
POSITION :
FINAL DEPTH: 15m

SURFACE ELEVATION :
TOP OF CASING:
ANGLE FROM HORIZONTAL : 90°

Drilling		Depth			SUBSTANCE	Well Construction	OTHER OBSERVATIONS
Method	Support	Depth (m)	Graphic Log	Description NAME: grain size / plasticity, color, structure, minor components	Well Construction Details	Construction notes	Notes (Structure, origin, etc)
		0		Dark brown sandy clay PID 0.0 ppm		Bentonite	
				Dark brown sandy clay, some gravels 2.5mm diameter			
		1		Filthy sandy clay PID 0.0ppm			
				Sandy clay some rock			
		2		Volcanic rock			
		3					
		4		Siltstone, start of wash broing			
		5					
				Harder rock			
		6				Filter Pack	
		7					
		8					
		9					
		10					
		11					
		12					
		13				Screen	
		14					
		15					
		16					

Notes: ▶ Inflow ▽ Standing Water Level

CONTRACTOR:
EQUIPMENT: Mobile Drill Rig

COMMENCED: 21/09/2016
COMPLETED: 21/09/2016

LOGGED BY: RO
CHECKED BY: GO

APPENDIX C – RESULTS TABLES

		VOC's								Metals								Organochlorine Pesticides																											
		Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEXN	Naphthalene	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Alpha BHC	Aldrin	Chlordane	gamma-Chlordane	b-BHC	d-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Lindane	Methoxychlor	Mirex	o,p-DDD	o,p'-DDE	DDD	DDT	trans-Nonachlor
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		0.5	0.5	0.5	1	0.5	1.5	3	0.5	1	0.1	1	1	1	0.1	1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 Schedule B1, Table 1C Groundwater Investigation Levels		**950**			**200**	**350**			**16**	**13**	**0.2**	**1**	**1.4**	**3.4**	**0.06**	**11**	**8**			**0.03**					**0.03**	**0.03**		**0.01**			**0.01**			**0.2**						**0.006**	
CRC CARE 2011 Table 1A(4) GW HSLs for Vapour Intrusion (HSL-A 4-8m, Clay)		**800**																																							
Field ID	**Sampled Date**																																								
M2	28/09/2016	**1**	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	**1.3**	<1	**4**	<1	<0.1	**20**	**67**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
M3	28/09/2016	<0.5	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	<0.1	<1	**1**	<1	<0.1	**2**	**21**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
M4	17/10/2016	<0.5	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	<0.1	<1	**1**	<1	<0.1	**2**	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
M5	17/10/2016	<0.5	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	<0.1	<1	**2**	<1	<0.1	**1**	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
M6	17/10/2016	<0.5	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	**0.2**	<1	**1**	<1	<0.1	**13**	**18**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
M7	17/10/2016	**1.1**	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	**0.2**	<1	**1**	<1	<0.1	**12**	**8**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
W1	22/09/2016	<0.5	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	**1**	<0.1	<1	<1	<1	<0.1	**1**	**25**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
W2	22/09/2016	<0.5	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	<0.1	<1	**1**	<1	<0.1	<1	**5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
W3	22/09/2016	<0.5	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	<0.1	<1	**1**	<1	<0.1	**1**	**22**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
QC22	28/09/2016	**0.8**	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	**1.4**	<1	**4**	<1	<0.1	**20**	**64**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
QC23	28/09/2016	<1	<2	<2	<2	<2	<2	<1	<5	<1	**1.4**	<1	**5**	<1	<0.1	**20**	**72**	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	-	-	<0.5	<2	-

Notes:

Bold font is where > LOR

Orange highlight is where value is > NEPM 2013 Schedule B1, Table 1C criteria

IS - Insufficient sample for analysis

		Organophosphorous Pesticides												PAH																		Phenols	TPH											
		Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Isodrin	Malathion	Methidathion	Parathion	1-Methylnaphthalene	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(b+j)fluoranthene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	Total PAHs	Total Phenols	C6 - C9	C6-C10	C6-C10 less BTEX (F1)	C10 - C14	C15 - C28	C29-C36	TRH C37-C40	C10-C16 (F2)	C16-C34 (F3)	C34-C40 (F4)	C10 - C36 (Total)	C10 - C40 (Total)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		0.2	0.2	0.2	0.5	0.5	0.5	0.2	0.2	0.1	0.2	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	10	40	50	50	50	200	50	200	60	500	500	450	650
NEPM 2013 Schedule B1, Table 1C Groundwater Investigation Levels				**0.01**	**0.01**		**0.15**		**0.2**		**0.05**		**0.004**																				**320**											
CRC CARE 2011 Table 1A(4) GW HSLs for Vapour Intrusion (HSL-A 4-8m, Clay)																																										
Field ID	**Sampled Date**																																										
M2	28/09/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
M3	28/09/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
M4	17/10/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
M5	17/10/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
M6	17/10/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
M7	17/10/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
W1	22/09/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
W2	22/09/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
W3	22/09/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	IS	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
QC22	28/09/2016	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	**20**	<40	<50	<50	<50	<200	<200	<200	<0.06	<0.5	<0.5	<450	<650
QC23	28/09/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	-	<2	-	-	<1	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<20	<20	<20	<50	<100	<50	-	<100	<100	<100	<50	<100

Notes: **Bold font is where > LOR**

Orange highlight is where v

IS - Insufficient sample for a

Table 2: Quality Assurance/Quality Control

		VOC's								Metals								Organochlorine Pesticides																															
		Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEXN	Naphthalene	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Alpha BHC	Aldrin	Chlordane	gamma-Chlordane	b-BHC	d-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Lindane	Methoxychlor	Mirex	o,p-DDD	o,p'-DDE	DDD	DDT	trans-Nonachlor
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Field ID	**Sampled Date**																																									
M2	28/09/2016	1	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	1.3	<1	4	<1	<0.1	20	67	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
QC22	28/09/2016	0.8	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	1.4	<1	4	<1	<0.1	20	64	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
RPD %		11	nc	nc	nc	nc	nc	nc	nc	nc	4	nc	0	nc	nc	0	2	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
M2	28/09/2016	1	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	1.3	<1	4	<1	<0.1	20	67	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
QC23	28/09/2016	<1	<2	<2	<2	<2	<2	<1	<5	<1	1.4	<1	5	<1	<0.1	20	72	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	-	-	<0.5	<2	-
RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	11	nc	nc	0	4	nc	nc	nc	-	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	-	-	-	nc	nc	-
QC22	28/09/2016	0.8	<0.5	<0.5	<1	<0.5	<1.5	<3	<0.5	<1	1.4	<1	4	<1	<0.1	20	64	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
QC23	28/09/2016	<1	<2	<2	<2	<2	<2	<1	<5	<1	1.4	<1	5	<1	<0.1	20	72	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	-	-	<0.5	<2	-
RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	0	nc	11	nc	nc	0	6	nc	nc	nc	-	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	-	-	-	nc	nc	-

Notes: nc - not calculated

Table 2: Quality Assurance/Quality Control

Organophosphorous Pesticides												
Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Isodrin	Malathion	Methidathion	Parathion
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2
<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2
nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	-	<2
nc	nc	nc	nc	nc	nc	nc	-	-	nc	-	nc
<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.1	<0.2	<0.5	<0.2
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	-	<2
nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

PAH																									
1-Methylnaphthalene	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(b+j)fluoranthene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	Total PAHs
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1
<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1
nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1
-	-	<1	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
-	-	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1
-	-	<1	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
-	-	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

Phenols	TPH											
Total Phenols	C6 - C9	C6-C10	C6-C10 less BTEX (F1)	C10 - C14	C15 - C28	C29-C36	TRH C37-C40	C10-C16 (F2)	C16-C34 (F3)	C34-C40 (F4)	C10 - C36 (Total)	C10 - C40 (Total)
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
20	<40	<50	<50	<50	<200	<200	<0.2	<0.06	<0.5	<0.5	<450	<650
nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
<10	<40	<50	<50	<50	<200	<200	<200	<60	<500	<500	<450	<650
-	<20	<0.02	<0.02	<50	<100	<50	-	<0.1	<0.1	<0.1	<50	<100
-	nc	nc	nc	nc	nc	nc	-	nc	nc	nc	nc	nc
20	<40	<50	<50	<50	<200	<200	<0.2	<0.06	<0.5	<0.5	<450	<650
-	<20	<0.02	<0.02	<50	<100	<50	-	<0.1	<0.1	<0.1	<50	<100
-	nc	nc	nc	nc	nc	nc	-	nc	nc	nc	nc	nc

APPENDIX D – LABORATORY REPORTS

E-MAILED
27/9/16 @ T: 09

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	SMEC	Project Name/No:	3002523 – Canberra Brickworks
Address:	Suite 2, Level 1, 243 Northbourne Avenue, Lyneham,	Purchase Order No:	
	ACT, 2602, Australia	Results Required By:	Ryan O'Leary
		Telephone:	+61 2 6234 1963 / 0400 240 023
Contact Name:	Ryan O'Leary	Facsimile:	
		Email Results:	Ryan.O'Leary@smec.com

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL		NO OF CONTAINERS	Asbestos ID	BTEXN	OPPs	OCPs	PHAs/Phenols	8 Metals - As, Cd, Cr, Cu, Ni, Pb, Zn, Hg	TPH/TRH	On Hold								Comment
M7_0.2-0.3	22/9/2016	1		✓		Jar & Bag	√	√	√	√	√	√	√									
M7_0.9-1.0	22/9/2016			√		Jar								√								
M8_0.2-0.3	22/9/2016	2		√		Jar & bag	√															
M8_0.7-0.8	22/9/2016	3		√		Jar		√	√	√	√	√	√									
M8_1.1-1.2	22/9/2016			√		Jar								√								
M8_1.6-1.7	22/9/2016			√		Jar								√								
M8_2.2-2.3	22/9/2016			√		Jar								√								
M8_4.2-4.3	22/9/2016			√		Jar								√								
HA/GB1_0.15-0.25	22/9/2016	4		√		Jar		√	√	√	√	√	√									
W1	22/9/2016	5		√		Jar & bag	√	√	√	√	√	√	√									

SGS EHS Alexandria Laboratory

SE157545 COC
Received: 23 – Sep – 2016

Relinquished By: Ryan O'Leary	Date/Time: 22/9/2016 16:00	Received By:	Date/Time 23/09/16 @ 10:50
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes) / No	Temperature: Ambient / (Chilled)	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No:
	Comments: AS PER SGS QUOTE NUMBER SY1 – 60413 – 2-IS DATED 13TH APRIL 2016	**STANDARD TAT PLEASE (5 DAY)**	

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	SMEC	Project Name/No:	3002523 – Canberra Brickworks
Address:	Suite 2, Level 1, 243 Northbourne Avenue, Lyneham, ACT, 2602, Australia	Purchase Order No:	
		Results Required By:	Ryan O'Leary
		Telephone:	+61 2 6234 1963 / 0400 240 023
Contact Name:	Ryan O'Leary	Facsimile:	
		Email Results:	Ryan.O'Leary@smec.com

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL		NO OF CONTAINERS	Asbestos ID	BTEXN	OPPs	OCPs	PAHs/Phenols	8H Metals - As, Cd, Cr, Cu, Ni, Pb, Zn, Hg	TPH/TRH	On Hold	PAH							Comment
W2	22/9/2016	6		✓		Jar & bag	√	√	√	√	√	√	√									
W3	22/9/2016	7		✓		Jar & bag	√	√	√	√	√	√	√									
W1	22/9/2016	8	✓			Bottles		√	√	√	√	√	√									
W2	22/9/2016	9	✓			Bottles		√	√	√	√	√	√									
W3	22/9/2016	10	✓			Bottles		√	√	√	√	√	√									
QC 18 (Trip Blank)	22/9/2016	11				Vial							√		√							
QC 19 (Trip Spike)	22/9/2016	12				Vial							√		√							

Relinquished By: Ryan O'Leary	Date/Time: 22/9/2016 16:00	Received By:	Date/Time 23/09/16 @ 10:50
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: Yes/ No	Temperature: Ambient / Chilled	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No:
	Comments: AS PER SGS QUOTE NUMBER SY1 – 60413 – 2-IS DATED 13TH APRIL 2016	**STANDARD TAT PLEASE (5 DAY)**	

SAMPLE RECEIPT ADVICE

SE157545

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
Facsimile	02 6234 1966
Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	12

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 23/9/2016
Report Due	Wed 5/10/2016
SGS Reference	**SE157545**

SUBMISSION DETAILS

This is to confirm that 12 samples were received on Friday 23/9/2016. Results are expected to be ready by Wednesday 5/10/2016. Please quote SGS reference SE157545 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	9 Soil, 3 Water	Type of documentation received	COC
Date documentation received	27/9/16@5:09pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	8.3°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

COC received at 27/9/16 @ 5:09pm. Request was not registered until the next business day.
5 soil samples have been placed on hold.
For W3, 125mL H2SO4 P/B was not received. Total Phenols will not be analysed.
One vial received broken for W2.
Trip Blank and Spike will only be analyzed for TRH/BTEX and BTEX respectively.

SAMPLE RECEIPT ADVICE

SE157545

CLIENT DETAILS

Client SMEC AUSTRALIA PTY LTD

Project 3002523 - Canberra Brickworks

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	Total Phenolics in Soil	Total Recoverable Metals in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	M7_0.2-0.3	28	13	26	1	7	10	12	8
003	M8_0.7-0.8	28	13	26	1	7	10	12	8
004	HA/GB1_0.15-0.25	28	13	26	1	7	10	12	8
005	W1	28	13	26	1	7	10	12	8
006	W2	28	13	26	1	7	10	12	8
007	W3	28	13	26	1	7	10	12	8
011	QC18 (Trip Blank)	-	-	-	-	-	10	12	8
012	QC19 (Trip Spike)	-	-	-	-	-	-	12	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE157545

CLIENT DETAILS

Client SMEC AUSTRALIA PTY LTD

Project 3002523 - Canberra Brickworks

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	M7_0.2-0.3	2	1	1	-	-
002	M8_0.2-0.3	2	-	-	-	-
003	M8_0.7-0.8	-	1	1	-	-
004	HA/GB1_0.15-0.25	-	1	1	-	-
005	W1	2	1	1	-	-
006	W2	2	1	1	-	-
007	W3	2	1	1	-	-
008	W1	-	-	-	12	8
009	W2	-	-	-	12	8
010	W3	-	-	-	12	8
011	QC18 (Trip Blank)	-	-	1	-	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE157545

CLIENT DETAILS

Client SMEC AUSTRALIA PTY LTD

Project 3002523 - Canberra Brickworks

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	OC Pesticides in Water	OP Pesticides in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	Total Phenolics in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water
008	W1	1	28	13	22	1	7	9
009	W2	1	28	13	22	1	7	9
010	W3	1	28	13	22	-	7	9

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
Facsimile	02 6234 1966
Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	12

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE157545 R0**
Date Received	23/9/2016
Date Reported	11/10/2016

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by Approved Identifier Ravee Sivasubramaniam.

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Bennet Lo
Senior Organic Chemist/Metals Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

VOC's in Soil [AN433] Tested: 29/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007	QC18 (Trip Blank) SOIL - 22/9/2016 SE157545.011	QC19 (Trip Spike) SOIL - 22/9/2016 SE157545.012
Benzene	mg/kg	0.1	<0.1	<0.1	[79%]
Toluene	mg/kg	0.1	<0.1	<0.1	[80%]
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	[93%]
m/p-xylene	mg/kg	0.2	<0.2	<0.2	[84%]
o-xylene	mg/kg	0.1	<0.1	<0.1	[98%]
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	-
Total BTEX	mg/kg	0.6	<0.6	<0.6	-
Naphthalene	mg/kg	0.1	<0.1	<0.1	-

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 29/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007	QC18 (Trip Blank) SOIL - 22/9/2016 SE157545.011
TRH C6-C9	mg/kg	20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 29/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007	QC18 (Trip Blank) SOIL - 22/9/2016 SE157545.011
TRH C10-C14	mg/kg	20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 29/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007
Naphthalene	mg/kg	0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1
Fluorene	mg/kg	0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1
Anthracene	mg/kg	0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1
Pyrene	mg/kg	0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1
Chrysene	mg/kg	0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8

OC Pesticides in Soil [AN400/AN420] Tested: 29/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 29/9/2016 (continued)

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane	mg/kg	0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1
Aldrin	mg/kg	0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2
Endrin	mg/kg	0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1
Isodrin	mg/kg	0.1	<0.1
Mirex	mg/kg	0.1	<0.1

OP Pesticides in Soil [AN400/AN420] Tested: 29/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007
Dichlorvos	mg/kg	0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2
Malathion	mg/kg	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2
Methidathion	mg/kg	0.5	<0.5
Ethion	mg/kg	0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2

Total Phenolics in Soil [AN289] Tested: 29/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
Total Phenols	mg/kg	0.1	**2.3**	<0.1	<0.1	<0.1	**0.4**

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007
Total Phenols	mg/kg	0.1	**1.8**

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 4/10/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
Arsenic, As	mg/kg	3	3	9	7	12	5
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	33	24	14	17	9.7
Copper, Cu	mg/kg	0.5	13	12	14	15	12
Lead, Pb	mg/kg	1	19	54	28	33	22
Nickel, Ni	mg/kg	0.5	9.8	13	21	16	7.9
Zinc, Zn	mg/kg	0.5	26	58	22	78	34

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007
Arsenic, As	mg/kg	3	5
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.3	14
Copper, Cu	mg/kg	0.5	11
Lead, Pb	mg/kg	1	25
Nickel, Ni	mg/kg	0.5	9.4
Zinc, Zn	mg/kg	0.5	44

Mercury in Soil [AN312] Tested: 4/10/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007
Mercury	mg/kg	0.05	<0.05

Moisture Content [AN002] Tested: 30/9/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.7-0.8 SOIL - 22/9/2016 SE157545.003	HA/GB1_0.15-0.25 SOIL - 22/9/2016 SE157545.004	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006
% Moisture	%w/w	0.5	20	16	8.9	26	20

PARAMETER	UOM	LOR	W3 SOIL - 22/9/2016 SE157545.007	QC18 (Trip Blank) SOIL - 22/9/2016 SE157545.011
% Moisture	%w/w	0.5	24	<0.5

Fibre Identification in soil [AN602] Tested: 4/10/2016

PARAMETER	UOM	LOR	M7_0.2-0.3 SOIL - 22/9/2016 SE157545.001	M8_0.2-0.3 SOIL - 22/9/2016 SE157545.002	W1 SOIL - 22/9/2016 SE157545.005	W2 SOIL - 22/9/2016 SE157545.006	W3 SOIL - 22/9/2016 SE157545.007
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

VOCs in Water [AN433] Tested: 30/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
Benzene	µg/L	0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 30/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
TRH C6-C9	µg/L	40	<40	<40	<40
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 29/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200
TRH >C10-C16 (F2)	µg/L	60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500
TRH C10-C36	µg/L	450	<450	<450	<450
TRH C10-C40	µg/L	650	<650	<650	<650

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 29/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1

OC Pesticides in Water [AN400/AN420] Tested: 29/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1	<0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1	<0.1
Aldrin	µg/L	0.1	<0.1	<0.1	<0.1
Beta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Delta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1	<0.1

OP Pesticides in Water [AN400/AN420] Tested: 29/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
Dichlorvos	µg/L	0.5	<0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2	<0.2	<0.2

Total Phenolics in Water [AN289] Tested: 30/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
Total Phenols	mg/L	0.01	<0.01	<0.01	IS

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 29/9/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
Arsenic, As	µg/L	1	1	<1	<1
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	<1
Copper, Cu	µg/L	1	<1	1	1
Lead, Pb	µg/L	1	<1	<1	<1
Nickel, Ni	µg/L	1	1	<1	1
Zinc, Zn	µg/L	5	25	5	22

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 4/10/2016

PARAMETER	UOM	LOR	W1 WATER - 22/9/2016 SE157545.008	W2 WATER - 22/9/2016 SE157545.009	W3 WATER - 22/9/2016 SE157545.010
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid , mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser . Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).

AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE157545 R0

CLIENT DETAILS

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Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	12

LABORATORY DETAILS

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SGS Reference	**SE157545 R0**
Date Received	23 Sep 2016
Date Reported	11 Oct 2016

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	VOCs in Water	3 items
	Volatile Petroleum Hydrocarbons in Water	3 items
Duplicate	VOCs in Water	1 item
	Volatile Petroleum Hydrocarbons in Water	1 item

SAMPLE SUMMARY

Sample counts by matrix	9 Soil, 3 Water	Type of documentation received	COC
Date documentation received	27/9/16@5:09pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	8.3°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

HOLDING TIME SUMMARY

SE157545 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB111013	22 Sep 2016	23 Sep 2016	22 Sep 2017	04 Oct 2016	22 Sep 2017	05 Oct 2016
M8_0.2-0.3	SE157545.002	LB111013	22 Sep 2016	23 Sep 2016	22 Sep 2017	04 Oct 2016	22 Sep 2017	05 Oct 2016
W1	SE157545.005	LB111013	22 Sep 2016	23 Sep 2016	22 Sep 2017	04 Oct 2016	22 Sep 2017	05 Oct 2016
W2	SE157545.006	LB111013	22 Sep 2016	23 Sep 2016	22 Sep 2017	04 Oct 2016	22 Sep 2017	05 Oct 2016
W3	SE157545.007	LB111013	22 Sep 2016	23 Sep 2016	22 Sep 2017	04 Oct 2016	22 Sep 2017	05 Oct 2016

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110970	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016
W2	SE157545.009	LB110970	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016
W3	SE157545.010	LB110970	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110977	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016
M8_0.7-0.8	SE157545.003	LB110977	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB110977	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016
W1	SE157545.005	LB110977	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016
W2	SE157545.006	LB110977	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016
W3	SE157545.007	LB110977	22 Sep 2016	23 Sep 2016	20 Oct 2016	04 Oct 2016	20 Oct 2016	05 Oct 2016

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110857	22 Sep 2016	23 Sep 2016	06 Oct 2016	30 Sep 2016	05 Oct 2016	05 Oct 2016
M8_0.7-0.8	SE157545.003	LB110857	22 Sep 2016	23 Sep 2016	06 Oct 2016	30 Sep 2016	05 Oct 2016	05 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB110857	22 Sep 2016	23 Sep 2016	06 Oct 2016	30 Sep 2016	05 Oct 2016	05 Oct 2016
W1	SE157545.005	LB110857	22 Sep 2016	23 Sep 2016	06 Oct 2016	30 Sep 2016	05 Oct 2016	05 Oct 2016
W2	SE157545.006	LB110857	22 Sep 2016	23 Sep 2016	06 Oct 2016	30 Sep 2016	05 Oct 2016	05 Oct 2016
W3	SE157545.007	LB110857	22 Sep 2016	23 Sep 2016	06 Oct 2016	30 Sep 2016	05 Oct 2016	05 Oct 2016
QC18 (Trip Blank)	SE157545.011	LB110857	22 Sep 2016	23 Sep 2016	06 Oct 2016	30 Sep 2016	05 Oct 2016	05 Oct 2016

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
M8_0.7-0.8	SE157545.003	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W1	SE157545.005	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W2	SE157545.006	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W3	SE157545.007	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
QC18 (Trip Blank)	SE157545.011	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W2	SE157545.009	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W3	SE157545.010	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
M8_0.7-0.8	SE157545.003	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W1	SE157545.005	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W2	SE157545.006	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W3	SE157545.007	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
QC18 (Trip Blank)	SE157545.011	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W2	SE157545.009	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W3	SE157545.010	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016

HOLDING TIME SUMMARY

SE157545 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
M8_0.7-0.8	SE157545.003	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W1	SE157545.005	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W2	SE157545.006	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W3	SE157545.007	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
QC18 (Trip Blank)	SE157545.011	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W2	SE157545.009	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W3	SE157545.010	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110743	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	06 Oct 2016	05 Oct 2016
M8_0.7-0.8	SE157545.003	LB110743	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	06 Oct 2016	05 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB110743	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	06 Oct 2016	05 Oct 2016
W1	SE157545.005	LB110743	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	06 Oct 2016	05 Oct 2016
W2	SE157545.006	LB110743	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	06 Oct 2016	05 Oct 2016
W3	SE157545.007	LB110743	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	06 Oct 2016	05 Oct 2016

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110849	22 Sep 2016	23 Sep 2016	20 Oct 2016	30 Sep 2016	20 Oct 2016	30 Sep 2016
W2	SE157545.009	LB110849	22 Sep 2016	23 Sep 2016	20 Oct 2016	30 Sep 2016	20 Oct 2016	30 Sep 2016

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB111001	22 Sep 2016	23 Sep 2016	21 Mar 2017	04 Oct 2016	21 Mar 2017	11 Oct 2016
M8_0.7-0.8	SE157545.003	LB111001	22 Sep 2016	23 Sep 2016	21 Mar 2017	04 Oct 2016	21 Mar 2017	11 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB111001	22 Sep 2016	23 Sep 2016	21 Mar 2017	04 Oct 2016	21 Mar 2017	11 Oct 2016
W1	SE157545.005	LB111001	22 Sep 2016	23 Sep 2016	21 Mar 2017	04 Oct 2016	21 Mar 2017	11 Oct 2016
W2	SE157545.006	LB111001	22 Sep 2016	23 Sep 2016	21 Mar 2017	04 Oct 2016	21 Mar 2017	11 Oct 2016
W3	SE157545.007	LB111001	22 Sep 2016	23 Sep 2016	21 Mar 2017	04 Oct 2016	21 Mar 2017	11 Oct 2016

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110745	22 Sep 2016	23 Sep 2016	21 Mar 2017	29 Sep 2016	21 Mar 2017	29 Sep 2016
W2	SE157545.009	LB110745	22 Sep 2016	23 Sep 2016	21 Mar 2017	29 Sep 2016	21 Mar 2017	29 Sep 2016
W3	SE157545.010	LB110745	22 Sep 2016	23 Sep 2016	21 Mar 2017	29 Sep 2016	21 Mar 2017	29 Sep 2016

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
M8_0.7-0.8	SE157545.003	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
HA/GB1_0.15-0.25	SE157545.004	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W1	SE157545.005	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W2	SE157545.006	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
W3	SE157545.007	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016
QC18 (Trip Blank)	SE157545.011	LB110824	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	05 Oct 2016

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W2	SE157545.009	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W3	SE157545.010	LB110738	22 Sep 2016	23 Sep 2016	29 Sep 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
M8_0.7-0.8	SE157545.003	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
HA/GB1_0.15-0.25	SE157545.004	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016

HOLDING TIME SUMMARY

SE157545 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.005	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W2	SE157545.006	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W3	SE157545.007	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
QC18 (Trip Blank)	SE157545.011	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
QC19 (Trip Spike)	SE157545.012	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110850	22 Sep 2016	23 Sep 2016	29 Sep 2016	30 Sep 2016†	09 Nov 2016	04 Oct 2016
W2	SE157545.009	LB110850	22 Sep 2016	23 Sep 2016	29 Sep 2016	30 Sep 2016†	09 Nov 2016	04 Oct 2016
W3	SE157545.010	LB110850	22 Sep 2016	23 Sep 2016	29 Sep 2016	30 Sep 2016†	09 Nov 2016	04 Oct 2016

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M7_0.2-0.3	SE157545.001	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
M8_0.7-0.8	SE157545.003	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
HA/GB1_0.15-0.25	SE157545.004	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W1	SE157545.005	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W2	SE157545.006	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
W3	SE157545.007	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
QC18 (Trip Blank)	SE157545.011	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016
QC19 (Trip Spike)	SE157545.012	LB110735	22 Sep 2016	23 Sep 2016	06 Oct 2016	29 Sep 2016	08 Nov 2016	30 Sep 2016

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W1	SE157545.008	LB110850	22 Sep 2016	23 Sep 2016	29 Sep 2016	30 Sep 2016†	09 Nov 2016	04 Oct 2016
W2	SE157545.009	LB110850	22 Sep 2016	23 Sep 2016	29 Sep 2016	30 Sep 2016†	09 Nov 2016	04 Oct 2016
W3	SE157545.010	LB110850	22 Sep 2016	23 Sep 2016	29 Sep 2016	30 Sep 2016†	09 Nov 2016	04 Oct 2016

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	85
	M8_0.7-0.8	SE157545.003	%	60 - 130%	82
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	79
	W1	SE157545.005	%	60 - 130%	88
	W2	SE157545.006	%	60 - 130%	85
	W3	SE157545.007	%	60 - 130%	91

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	W1	SE157545.008	%	40 - 130%	59
	W2	SE157545.009	%	40 - 130%	61
	W3	SE157545.010	%	40 - 130%	40

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	76
	M8_0.7-0.8	SE157545.003	%	60 - 130%	80
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	78
	W1	SE157545.005	%	60 - 130%	80
	W2	SE157545.006	%	60 - 130%	80
	W3	SE157545.007	%	60 - 130%	80
d14-p-terphenyl (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	86
	M8_0.7-0.8	SE157545.003	%	60 - 130%	90
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	96
	W1	SE157545.005	%	60 - 130%	92
	W2	SE157545.006	%	60 - 130%	92
	W3	SE157545.007	%	60 - 130%	92

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	W1	SE157545.008	%	40 - 130%	52
	W2	SE157545.009	%	40 - 130%	68
	W3	SE157545.010	%	40 - 130%	40
d14-p-terphenyl (Surrogate)	W1	SE157545.008	%	40 - 130%	82
	W2	SE157545.009	%	40 - 130%	62
	W3	SE157545.010	%	40 - 130%	48

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	M7_0.2-0.3	SE157545.001	%	70 - 130%	76
	M8_0.7-0.8	SE157545.003	%	70 - 130%	80
	HA/GB1_0.15-0.25	SE157545.004	%	70 - 130%	78
	W1	SE157545.005	%	70 - 130%	80
	W2	SE157545.006	%	70 - 130%	80
	W3	SE157545.007	%	70 - 130%	80
d14-p-terphenyl (Surrogate)	M7_0.2-0.3	SE157545.001	%	70 - 130%	86
	M8_0.7-0.8	SE157545.003	%	70 - 130%	90
	HA/GB1_0.15-0.25	SE157545.004	%	70 - 130%	96
	W1	SE157545.005	%	70 - 130%	92
	W2	SE157545.006	%	70 - 130%	92
	W3	SE157545.007	%	70 - 130%	92
d5-nitrobenzene (Surrogate)	M7_0.2-0.3	SE157545.001	%	70 - 130%	76
	M8_0.7-0.8	SE157545.003	%	70 - 130%	78
	HA/GB1_0.15-0.25	SE157545.004	%	70 - 130%	76
	W1	SE157545.005	%	70 - 130%	78
	W2	SE157545.006	%	70 - 130%	76
	W3	SE157545.007	%	70 - 130%	78

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	W1	SE157545.008	%	40 - 130%	52
	W2	SE157545.009	%	40 - 130%	68
	W3	SE157545.010	%	40 - 130%	40

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d14-p-terphenyl (Surrogate)	W1	SE157545.008	%	40 - 130%	82
	W2	SE157545.009	%	40 - 130%	62
	W3	SE157545.010	%	40 - 130%	48
d5-nitrobenzene (Surrogate)	W1	SE157545.008	%	40 - 130%	52
	W2	SE157545.009	%	40 - 130%	64
	W3	SE157545.010	%	40 - 130%	46

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	108
	M8_0.7-0.8	SE157545.003	%	60 - 130%	107
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	106
	W1	SE157545.005	%	60 - 130%	109
	W2	SE157545.006	%	60 - 130%	116
	W3	SE157545.007	%	60 - 130%	109
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	108
	QC19 (Trip Spike)	SE157545.012	%	60 - 130%	108
d4-1,2-dichloroethane (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	82
	M8_0.7-0.8	SE157545.003	%	60 - 130%	93
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	106
	W1	SE157545.005	%	60 - 130%	99
	W2	SE157545.006	%	60 - 130%	102
	W3	SE157545.007	%	60 - 130%	102
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	117
	QC19 (Trip Spike)	SE157545.012	%	60 - 130%	121
d8-toluene (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	105
	M8_0.7-0.8	SE157545.003	%	60 - 130%	78
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	89
	W1	SE157545.005	%	60 - 130%	76
	W2	SE157545.006	%	60 - 130%	84
	W3	SE157545.007	%	60 - 130%	77
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	89
	QC19 (Trip Spike)	SE157545.012	%	60 - 130%	72
Dibromofluoromethane (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	79
	M8_0.7-0.8	SE157545.003	%	60 - 130%	108
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	79
	W1	SE157545.005	%	60 - 130%	72
	W2	SE157545.006	%	60 - 130%	74
	W3	SE157545.007	%	60 - 130%	76
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	91
	QC19 (Trip Spike)	SE157545.012	%	60 - 130%	92

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	W1	SE157545.008	%	40 - 130%	93
	W2	SE157545.009	%	40 - 130%	93
	W3	SE157545.010	%	40 - 130%	91
d4-1,2-dichloroethane (Surrogate)	W1	SE157545.008	%	40 - 130%	97
	W2	SE157545.009	%	40 - 130%	96
	W3	SE157545.010	%	40 - 130%	98
d8-toluene (Surrogate)	W1	SE157545.008	%	40 - 130%	93
	W2	SE157545.009	%	40 - 130%	95
	W3	SE157545.010	%	40 - 130%	93
Dibromofluoromethane (Surrogate)	W1	SE157545.008	%	40 - 130%	103
	W2	SE157545.009	%	40 - 130%	103
	W3	SE157545.010	%	40 - 130%	105

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	108
	M8_0.7-0.8	SE157545.003	%	60 - 130%	107
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	106

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	W1	SE157545.005	%	60 - 130%	109
	W2	SE157545.006	%	60 - 130%	116
	W3	SE157545.007	%	60 - 130%	109
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	108
d4-1,2-dichloroethane (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	82
	M8_0.7-0.8	SE157545.003	%	60 - 130%	93
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	106
	W1	SE157545.005	%	60 - 130%	99
	W2	SE157545.006	%	60 - 130%	102
	W3	SE157545.007	%	60 - 130%	102
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	117
d8-toluene (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	105
	M8_0.7-0.8	SE157545.003	%	60 - 130%	78
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	89
	W1	SE157545.005	%	60 - 130%	76
	W2	SE157545.006	%	60 - 130%	84
	W3	SE157545.007	%	60 - 130%	77
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	89
Dibromofluoromethane (Surrogate)	M7_0.2-0.3	SE157545.001	%	60 - 130%	79
	M8_0.7-0.8	SE157545.003	%	60 - 130%	108
	HA/GB1_0.15-0.25	SE157545.004	%	60 - 130%	79
	W1	SE157545.005	%	60 - 130%	72
	W2	SE157545.006	%	60 - 130%	74
	W3	SE157545.007	%	60 - 130%	76
	QC18 (Trip Blank)	SE157545.011	%	60 - 130%	91

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	W1	SE157545.008	%	40 - 130%	93
	W2	SE157545.009	%	40 - 130%	93
	W3	SE157545.010	%	40 - 130%	91
d4-1,2-dichloroethane (Surrogate)	W1	SE157545.008	%	60 - 130%	97
	W2	SE157545.009	%	60 - 130%	96
	W3	SE157545.010	%	60 - 130%	98
d8-toluene (Surrogate)	W1	SE157545.008	%	40 - 130%	93
	W2	SE157545.009	%	40 - 130%	95
	W3	SE157545.010	%	40 - 130%	93
Dibromofluoromethane (Surrogate)	W1	SE157545.008	%	40 - 130%	103
	W2	SE157545.009	%	40 - 130%	103
	W3	SE157545.010	%	40 - 130%	105

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB110970.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB110977.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB110824.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	85

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result
LB110738.001	Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
	Alpha BHC	µg/L	0.1	<0.1
	Lindane (gamma BHC)	µg/L	0.1	<0.1
	Heptachlor	µg/L	0.1	<0.1
	Aldrin	µg/L	0.1	<0.1
	Beta BHC	µg/L	0.1	<0.1
	Delta BHC	µg/L	0.1	<0.1
	Heptachlor epoxide	µg/L	0.1	<0.1
	Alpha Endosulfan	µg/L	0.1	<0.1
	Gamma Chlordane	µg/L	0.1	<0.1
	Alpha Chlordane	µg/L	0.1	<0.1
	p,p'-DDE	µg/L	0.1	<0.1
	Dieldrin	µg/L	0.1	<0.1
	Endrin	µg/L	0.1	<0.1
	Beta Endosulfan	µg/L	0.1	<0.1
	p,p'-DDD	µg/L	0.1	<0.1
	p,p'-DDT	µg/L	0.1	<0.1
	Endosulfan sulphate	µg/L	0.1	<0.1
	Endrin aldehyde	µg/L	0.1	<0.1
	Methoxychlor	µg/L	0.1	<0.1
	Endrin ketone	µg/L	0.1	<0.1
	Isodrin	µg/L	0.1	<0.1
	Mirex	µg/L	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Water (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB110738.001	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	78

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB110824.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	80
		d14-p-terphenyl (Surrogate)	%	-	94

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB110738.001		Dichlorvos	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2
		Malathion	µg/L	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
		Bromophos Ethyl	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Azinphos-methyl	µg/L	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	72
		d14-p-terphenyl (Surrogate)	%	-	110

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB110824.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	84
		2-fluorobiphenyl (Surrogate)	%	-	80
		d14-p-terphenyl (Surrogate)	%	-	94

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB110738.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB110738.001		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	76
		2-fluorobiphenyl (Surrogate)	%	-	72
		d14-p-terphenyl (Surrogate)	%	-	110

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB110743.001	Total Phenols	mg/kg	0.1	<0.1

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB110849.001	Total Phenols	mg/L	0.01	<0.01

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB111001.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB110745.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB110824.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB110738.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB110735.001	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1
	Hydrocarbons	Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	97
		d4-1,2-dichloroethane (Surrogate)	%	-	129
		d8-toluene (Surrogate)	%	-	74
		Bromofluorobenzene (Surrogate)	%	-	114
	Totals	Total BTEX	mg/kg	0.6	<0.6

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB110850.001	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5
	Hydrocarbons	Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	99
		d4-1,2-dichloroethane (Surrogate)	%	-	91
		d8-toluene (Surrogate)	%	-	99
		Bromofluorobenzene (Surrogate)	%	-	93

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB110735.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	97
		d4-1,2-dichloroethane (Surrogate)	%	-	129
		d8-toluene (Surrogate)	%	-	74

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB110850.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	99
		d4-1,2-dichloroethane (Surrogate)	%	-	91
		d8-toluene (Surrogate)	%	-	99
		Bromofluorobenzene (Surrogate)	%	-	93

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157544.005	LB110970.014	Mercury	µg/L	0.0001	<0.0001	0.0000	200	24

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157535.001	LB110977.014	Mercury	mg/kg	0.05	<0.01	<0.01	200	0
SE157545.007	LB110977.024	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157527.002	LB110857.011	% Moisture	%w/w	0.5	5.9	5.6	47	5
SE157533.002	LB110857.022	% Moisture	%w/w	0.5	43.7	41.7	32	5
SE157545.001	LB110857.033	% Moisture	%w/w	0.5	20	21	35	3
SE157545.011	LB110857.040	% Moisture	%w/w	0.5	<0.5	<0.5	200	0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157527.008	LB110824.024		Naphthalene	mg/kg	0.1	<0.1	0.01	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	0.02	200	0
			Acenaphthene	mg/kg	0.1	<0.1	0	200	0
			Fluorene	mg/kg	0.1	<0.1	0	200	0
			Phenanthrene	mg/kg	0.1	0.2	0.12	99	34
			Anthracene	mg/kg	0.1	<0.1	0.02	200	0
			Fluoranthene	mg/kg	0.1	0.5	0.34	54	36
			Pyrene	mg/kg	0.1	0.5	0.42	52	15
			Benzo(a)anthracene	mg/kg	0.1	0.3	0.2	69	43
			Chrysene	mg/kg	0.1	0.2	0.15	81	46
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.3	0.18	75	36
			Benzo(k)fluoranthene	mg/kg	0.1	0.1	0.07	125	33
			Benzo(a)pyrene	mg/kg	0.1	0.2	0.13	87	51
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.1	0.07	141	10
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0.01	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0.1	0.06	155	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	0.3	0.1765	93	42
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	0.4	0.2875	96	30
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	0.4	0.232	78	42
			Total PAH (18)	mg/kg	0.8	2.5	1.61	69	45
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.41	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.43	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	16

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157545.001	LB110743.004	Total Phenols	mg/kg	0.1	2.3	2.3	19	0

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157605.009	LB111001.024	Arsenic, As	mg/kg	3	3.44071258054	.5183056029	55	27
		Cadmium, Cd	mg/kg	0.3	0.39559060230	.4120273720	104	4
		Chromium, Cr	mg/kg	0.3	26.284316075	24.831465617	32	6
		Copper, Cu	mg/kg	0.5	27.283889000	84.719703352	32	10
		Lead, Pb	mg/kg	1	18.707944198	20.038330323	35	7
		Nickel, Ni	mg/kg	0.5	28.220406929	26.748952411	32	5
		Zinc, Zn	mg/kg	0.5	00.190743352	08.957737647	32	8

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Trace Metals (Dissolved) in Water by ICPMS (continued)

Method: ME-(AU)-[ENV]AN318

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157499.003	LB110745.014		Arsenic, As	µg/L	1	<1	<1	200	0
			Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
			Chromium, Cr	µg/L	1	<1	<1	200	0
			Copper, Cu	µg/L	1	<1	<1	200	0
			Lead, Pb	µg/L	1	<1	<1	200	0
			Nickel, Ni	µg/L	1	<1	<1	200	0
			Zinc, Zn	µg/L	5	<5	<5	200	0
SE157566.002	LB110745.028		Arsenic, As	µg/L	1	2	2	70	1
			Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
			Chromium, Cr	µg/L	1	<1	<1	200	0
			Copper, Cu	µg/L	1	2	2	79	6
			Lead, Pb	µg/L	1	<1	<1	200	0
			Nickel, Ni	µg/L	1	36	36	18	0
			Zinc, Zn	µg/L	5	35	34	29	2
SE157580.032	LB110745.031		Arsenic, As	µg/L	1	<1	<1	200	0
			Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
			Chromium, Cr	µg/L	1	<1	<1	200	0
			Copper, Cu	µg/L	1	<1	<1	166	0
			Lead, Pb	µg/L	1	<1	<1	200	0
			Nickel, Ni	µg/L	1	<1	<1	200	0
			Zinc, Zn	µg/L	5	<5	<5	152	0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157527.008	LB110824.024		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total	mg/kg	210	<210	0	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	0	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0
SE157545.011	LB110824.022		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157559.002	LB110735.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	4.2	50	4
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.8	5.6	50	4
			d8-toluene (Surrogate)	mg/kg	-	4.4	3.9	50	12
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.5	5.4	50	3
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE157567.004	LB110735.020	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157567.004	LB110735.020	Monocyclic	m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
		Aromatic	o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	3.9	50	6
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	3.7	50	14
			d8-toluene (Surrogate)	mg/kg	-	4.5	3.9	50	13
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.3	4.6	50	7
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157560.001	LB110850.018	Monocyclic	Benzene	µg/L	0.5	1.0	2.0	63	64 ③
		Aromatic	Toluene	µg/L	0.5	<0.5	<0.5	200	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	<0.5	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.1	4.8	30	6
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.7	4.8	30	3
			d8-toluene (Surrogate)	µg/L	-	4.5	5.2	30	13
			Bromofluorobenzene (Surrogate)	µg/L	-	4.8	5.0	30	5

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157559.002	LB110735.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	4.2	30	4
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.8	5.6	30	4
			d8-toluene (Surrogate)	mg/kg	-	4.4	3.9	30	12
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.5	5.4	30	3
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE157567.004	LB110735.020		TRH C6-C10	mg/kg	25	120	89	54	31
			TRH C6-C9	mg/kg	20	72	54	62	30
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	3.9	30	6
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	3.7	30	14
			d8-toluene (Surrogate)	mg/kg	-	4.5	3.9	30	13
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.3	4.6	30	7
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	120	89	54	31

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157560.001	LB110850.018		TRH C6-C10	µg/L	50	66	80	99	19
			TRH C6-C9	µg/L	40	66	80	85	19
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.1	4.8	30	6
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.7	4.8	30	3
			d8-toluene (Surrogate)	µg/L	-	4.5	5.2	30	13
			Bromofluorobenzene (Surrogate)	µg/L	-	4.8	5.0	30	5
		VPH F Bands	Benzene (F0)	µg/L	0.5	1.0	2.0	63	64 ③
			TRH C6-C10 minus BTEX (F1)	µg/L	50	65	78	100	18

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110977.002	Mercury	mg/kg	0.05	0.20	0.2	70 - 130	102

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110824.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	112
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	104
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	108
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	92
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	115
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	125
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.13	0.15	40 - 130	83

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110738.002		Heptachlor	µg/L	0.1	0.3	0.2	60 - 140	125
		Aldrin	µg/L	0.1	0.2	0.2	60 - 140	118
		Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	117
		Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	119
		Endrin	µg/L	0.1	0.3	0.2	60 - 140	125
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	117
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.14	0.15	40 - 130	96

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110824.002		Dichlorvos	mg/kg	0.5	1.7	2	60 - 140	85
		Diazinon (Dimpylate)	mg/kg	0.5	1.7	2	60 - 140	83
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.7	2	60 - 140	87
		Ethion	mg/kg	0.2	1.5	2	60 - 140	76
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	74
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	82

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110738.002		Dichlorvos	µg/L	0.5	8.6	8	60 - 140	107
		Diazinon (Dimpylate)	µg/L	0.5	8.6	8	60 - 140	107
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	8.7	8	60 - 140	109
		Ethion	µg/L	0.2	8.2	8	60 - 140	103
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	76
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	72

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110824.002		Naphthalene	mg/kg	0.1	3.6	4	60 - 140	90
		Acenaphthylene	mg/kg	0.1	3.5	4	60 - 140	88
		Acenaphthene	mg/kg	0.1	3.5	4	60 - 140	88
		Phenanthrene	mg/kg	0.1	3.6	4	60 - 140	89
		Anthracene	mg/kg	0.1	3.6	4	60 - 140	89
		Fluoranthene	mg/kg	0.1	3.6	4	60 - 140	90
		Pyrene	mg/kg	0.1	3.5	4	60 - 140	87
		Benzo(a)pyrene	mg/kg	0.1	3.8	4	60 - 140	95
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	74
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	74
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	82

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110738.002	Naphthalene	µg/L	0.1	32	40	60 - 140	79
	Acenaphthylene	µg/L	0.1	36	40	60 - 140	89
	Acenaphthene	µg/L	0.1	35	40	60 - 140	88
	Phenanthrene	µg/L	0.1	36	40	60 - 140	89
	Anthracene	µg/L	0.1	33	40	60 - 140	81
	Fluoranthene	µg/L	0.1	36	40	60 - 140	91

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110738.002		Pyrene	µg/L	0.1	34	40	60 - 140	86
		Benzo(a)pyrene	µg/L	0.1	33	40	60 - 140	82
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.4	0.5	40 - 130	70
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	76
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	72

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110743.002	Total Phenols	mg/kg	0.1	2.2	2.5	70 - 130	87

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110849.002	Total Phenols	mg/L	0.01	0.22	0.25	80 - 120	88

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB111001.002	Arsenic, As	mg/kg	3	49	50	80 - 120	99
	Cadmium, Cd	mg/kg	0.3	51	50	80 - 120	102
	Chromium, Cr	mg/kg	0.3	50	50	80 - 120	99
	Copper, Cu	mg/kg	0.5	51	50	80 - 120	101
	Lead, Pb	mg/kg	1	50	50	80 - 120	101
	Nickel, Ni	mg/kg	0.5	50	50	80 - 120	100
	Zinc, Zn	mg/kg	0.5	51	50	80 - 120	101

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110745.002	Arsenic, As	µg/L	1	20	20	80 - 120	101
	Cadmium, Cd	µg/L	0.1	22	20	80 - 120	110
	Chromium, Cr	µg/L	1	23	20	80 - 120	113
	Copper, Cu	µg/L	1	23	20	80 - 120	114
	Lead, Pb	µg/L	1	23	20	80 - 120	113
	Nickel, Ni	µg/L	1	21	20	80 - 120	105
	Zinc, Zn	µg/L	5	20	20	80 - 120	100

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110824.002		TRH C10-C14	mg/kg	20	38	40	60 - 140	95
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	100
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	103
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	39	40	60 - 140	98
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	108
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	100

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110738.002		TRH C10-C14	µg/L	50	920	1200	60 - 140	77
		TRH C15-C28	µg/L	200	1200	1200	60 - 140	103
		TRH C29-C36	µg/L	200	1400	1200	60 - 140	119
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1100	1200	60 - 140	88
		TRH >C16-C34 (F3)	µg/L	500	1400	1200	60 - 140	115
		TRH >C34-C40 (F4)	µg/L	500	740	600	60 - 140	123

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110735.002	Monocyclic	Benzene	mg/kg	0.1	2.5	2.9	60 - 140	86
	Aromatic	Toluene	mg/kg	0.1	2.1	2.9	60 - 140	72
		Ethylbenzene	mg/kg	0.1	2.2	2.9	60 - 140	76
		m/p-xylene	mg/kg	0.2	5.8	5.8	60 - 140	101
		o-xylene	mg/kg	0.1	2.6	2.9	60 - 140	90
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	94

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110735.002	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	6.0	5	60 - 140	119
		d8-toluene (Surrogate)	mg/kg	-	3.5	5	60 - 140	70
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.6	5	60 - 140	113

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110850.002	Monocyclic	Benzene	µg/L	0.5	50	45.45	60 - 140	110
	Aromatic	Toluene	µg/L	0.5	50	45.45	60 - 140	110
		Ethylbenzene	µg/L	0.5	50	45.45	60 - 140	110
		m/p-xylene	µg/L	1	100	90.9	60 - 140	110
		o-xylene	µg/L	0.5	50	45.45	60 - 140	109
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	4.7	5	60 - 140	93
		Bromofluorobenzene (Surrogate)	µg/L	-	4.7	5	60 - 140	94

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110735.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	97
		TRH C6-C9	mg/kg	20	20	23.2	60 - 140	87
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	94
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	6.0	5	60 - 140	119
		d8-toluene (Surrogate)	mg/kg	-	3.5	5	60 - 140	70
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.6	5	60 - 140	113
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	121

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110850.002		TRH C6-C10	µg/L	50	940	946.63	60 - 140	99
		TRH C6-C9	µg/L	40	770	818.71	60 - 140	94
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.9	5	60 - 140	98
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	5	60 - 140	101
		d8-toluene (Surrogate)	µg/L	-	5.1	5	60 - 140	102
		Bromofluorobenzene (Surrogate)	µg/L	-	5.0	5	60 - 140	101
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	630	639.67	60 - 140	99

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157527.001	LB110977.004	Mercury	mg/kg	0.05	0.26	0.09	0.2	85

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE157527.001	LB110824.023		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	<0.1	0.2	119
			Aldrin	mg/kg	0.1	<0.1	0.2	110
			Beta BHC	mg/kg	0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	<0.1	0.2	119
			Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	0.2	89
			Endrin	mg/kg	0.2	<0.2	0.2	120
			o,p'-DDD	mg/kg	0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	<0.1	0.2	124
			Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.13	-	83

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE157527.001	LB110824.023		Dichlorvos	mg/kg	0.5	<0.5	2	85
			Dimethoate	mg/kg	0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	2	77
			Fenitrothion	mg/kg	0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	2	89
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	-	-
			Ethion	mg/kg	0.2	<0.2	2	73
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	-	84
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	-	96

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Original	Spike	Recovery%
SE157527.001	LB110824.023	Naphthalene	mg/kg	0.1	<0.1	4	101
		2-methylnaphthalene	mg/kg	0.1	<0.1	-	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	-	-
		Acenaphthylene	mg/kg	0.1	<0.1	4	98
		Acenaphthene	mg/kg	0.1	<0.1	4	101
		Fluorene	mg/kg	0.1	<0.1	-	-
		Phenanthrene	mg/kg	0.1	<0.1	4	103
		Anthracene	mg/kg	0.1	<0.1	4	101
		Fluoranthene	mg/kg	0.1	0.3	4	114

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE157527.001	LB110824.023		Pyrene	mg/kg	0.1	0.2	4	102
			Benzo(a)anthracene	mg/kg	0.1	0.2	-	-
			Chrysene	mg/kg	0.1	0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.2	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	0.2	4	105
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	0.3	-	-
			Total PAH (18)	mg/kg	0.8	1.5	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	-	84
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	-	84
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	-	96

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157443.013	LB110743.015	Total Phenols	mg/kg	0.1	2.4	<0.1	2.5	95

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155387.002	LB110849.010	Total Phenols	mg/L	0.01	0.22	<0.01	0.25	86

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157471.013	LB110745.004	Arsenic, As	µg/L	1	20	<1	20	102
		Cadmium, Cd	µg/L	0.1	22	<0.1	20	112
		Chromium, Cr	µg/L	1	23	<1	20	114
		Copper, Cu	µg/L	1	23	<1	20	115
		Lead, Pb	µg/L	1	22	<1	20	112
		Nickel, Ni	µg/L	1	21	<1	20	105
		Zinc, Zn	µg/L	5	22	<5	20	101

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE157526.001	LB110824.023		TRH C10-C14	mg/kg	20	<20	40	95
			TRH C15-C28	mg/kg	45	<45	40	120
			TRH C29-C36	mg/kg	45	<45	40	108
			TRH C37-C40	mg/kg	100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	-	-
			TRH C10-C40 Total	mg/kg	210	<210	-	-
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	40	95
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	133
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157545.001	LB110735.004	Monocyclic	Benzene	mg/kg	0.1	2.1	<0.1	2.9	73
		Aromatic	Toluene	mg/kg	0.1	1.9	<0.1	2.9	65
			Ethylbenzene	mg/kg	0.1	1.9	<0.1	2.9	64
			m/p-xylene	mg/kg	0.2	4.7	<0.2	5.8	81
			o-xylene	mg/kg	0.1	2.2	<0.1	2.9	74
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.9	4.0	-	97
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.5	4.1	-	91

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157545.001	LB110735.004	Surrogates	d8-toluene (Surrogate)	mg/kg	-	4.0	5.3	-	80
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.3	5.4	-	107
		Totals	Total Xylenes*	mg/kg	0.3	6.8	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157545.001	LB110735.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	83
			TRH C6-C9	mg/kg	20	<20	<20	23.2	80
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.9	4.0	-	97
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.5	4.1	-	91
			d8-toluene (Surrogate)	mg/kg	-	4.0	5.3	-	80
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.3	5.4	-	107
		VPH F	Benzene (F0)	mg/kg	0.1	2.1	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	108

MATRIX SPIKE DUPLICATES

SE157545 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover tthe performance of this service.
-	Sample not analysed for this analyte.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name: SMEC
Address: Suite 2, Level 1, 243 Northbourne Avenue, Lyneham, ACT, 2602, Australia
Contact Name: Ryan O'Leary

Project Name/No: 3002523 – Canberra Brickworks
Purchase Order No:
Results Required By: Ryan O'Leary
Telephone: +61 2 6234 1963 / 0400 240 023
Facsimile:
Email Results: Ryan.O'Leary@smec.com

SGS EHS Alexandria Laboratory
SE157659 COC
Received: 30 – Sep – 2016

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL		NO OF CONTAINERS	BTEXN	OPPs	OCPs	PAHs/Phenols	8H Metals - As, Cd, Cr, Cu, Ni, Pb, Zn, Hg	TPH/TRH	Comment
M2	28/9/2016	1	✓			5	√	√	√	√	√	√	
M3	28/9/2016	2	✓			5	√	√	√	√	√	√	
QC22	28/9/2016	3	✓			5	√	√	√	√	√	√	
QC23	28/9/2016		✓			5	√	√	√	√	√	√	**Please send to ALS Sydney**

Relinquished By: Ryan O'Leary
Date/Time: 29/9/2016 16:00
Received By:
Date/Time

Relinquished By:
Date/Time:
Received By:
Date/Time 30/9/16 @ 10:00

Samples Intact: Yes/ No
Temperature: Ambient / Chilled 16.8
Sample Cooler Sealed: Yes/ No
Laboratory Quotation No:

Comments: AS PER SGS QUOTE NUMBER SY1 – 60413 – 2-IS DATED 13TH APRIL 2016
Laboratory to filter metals and report as dissolved

STANDARD TAT PLEASE (5 DAY)

SAMPLE RECEIPT ADVICE

SE157659

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
Facsimile	02 6234 1966
Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	3

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 30/9/2016
Report Due	Mon 10/10/2016
SGS Reference	**SE157659**

SUBMISSION DETAILS

This is to confirm that 3 samples were received on Friday 30/9/2016. Results are expected to be ready by Monday 10/10/2016. Please quote SGS reference SE157659 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	3 Water	Type of documentation received	COC
Date documentation received	30/9/2016	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	16.8°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

QC23 has been forwarded to ALS Sydney.

SAMPLE RECEIPT ADVICE

SE157659

CLIENT DETAILS

Client SMEC AUSTRALIA PTY LTD

Project 3002523 - Canberra Brickworks

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Water	OP Pesticides in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	Total Phenolics in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	M2	28	13	22	1	7	9	12	8
002	M3	28	13	22	1	7	9	12	8
003	QC22	28	13	22	1	7	9	12	8

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE157659

CLIENT DETAILS

Client SMEC AUSTRALIA PTY LTD

Project 3002523 - Canberra Brickworks

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water
001	M2	1
002	M3	1
003	QC22	1

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
Facsimile	02 6234 1966
Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	3

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE157659 R0**
Date Received	30/9/2016
Date Reported	10/10/2016

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

VOCs in Water [AN433] Tested: 4/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
Benzene	µg/L	0.5	**1.0**	<0.5	**0.8**
Toluene	µg/L	0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 4/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
TRH C6-C9	µg/L	40	<40	<40	<40
Benzene (F0)	µg/L	0.5	**1.0**	<0.5	**0.8**
TRH C6-C10	µg/L	50	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 4/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200
TRH >C10-C16 (F2)	µg/L	60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500
TRH C10-C36	µg/L	450	<450	<450	<450
TRH C10-C40	µg/L	650	<650	<650	<650

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 4/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1

OC Pesticides in Water [AN400/AN420] Tested: 4/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1	<0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1	<0.1
Aldrin	µg/L	0.1	<0.1	<0.1	<0.1
Beta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Delta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1	<0.1

OP Pesticides in Water [AN400/AN420] Tested: 4/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
Dichlorvos	µg/L	0.5	<0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2	<0.2	<0.2

Total Phenolics in Water [AN289] Tested: 5/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
Total Phenols	mg/L	0.01	<0.01	<0.01	**0.02**

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 5/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
Arsenic, As	µg/L	1	<1	<1	<1
Cadmium, Cd	µg/L	0.1	**1.3**	<0.1	**1.4**
Chromium, Cr	µg/L	1	<1	<1	<1
Copper, Cu	µg/L	1	**4**	**1**	**4**
Lead, Pb	µg/L	1	<1	<1	<1
Nickel, Ni	µg/L	1	**20**	**2**	**20**
Zinc, Zn	µg/L	5	**67**	**21**	**64**

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 6/10/2016

PARAMETER	UOM	LOR	M2 WATER - 28/9/2016 SE157659.001	M3 WATER - 28/9/2016 SE157659.002	QC22 WATER - 28/9/2016 SE157659.003
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is not corrected for Naphthalene.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE157659 R0

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
Facsimile	02 6234 1966
Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	3

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE157659 R0**
Date Received	30 Sep 2016
Date Reported	10 Oct 2016

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SE157659 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB111204	28 Sep 2016	30 Sep 2016	26 Oct 2016	06 Oct 2016	26 Oct 2016	07 Oct 2016
M3	SE157659.002	LB111204	28 Sep 2016	30 Sep 2016	26 Oct 2016	06 Oct 2016	26 Oct 2016	07 Oct 2016
QC22	SE157659.003	LB111204	28 Sep 2016	30 Sep 2016	26 Oct 2016	06 Oct 2016	26 Oct 2016	07 Oct 2016

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	06 Oct 2016
M3	SE157659.002	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	06 Oct 2016
QC22	SE157659.003	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	06 Oct 2016

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016
M3	SE157659.002	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016
QC22	SE157659.003	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016
M3	SE157659.002	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016
QC22	SE157659.003	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB111042	28 Sep 2016	30 Sep 2016	26 Oct 2016	05 Oct 2016	26 Oct 2016	05 Oct 2016
M3	SE157659.002	LB111042	28 Sep 2016	30 Sep 2016	26 Oct 2016	05 Oct 2016	26 Oct 2016	05 Oct 2016
QC22	SE157659.003	LB111042	28 Sep 2016	30 Sep 2016	26 Oct 2016	05 Oct 2016	26 Oct 2016	05 Oct 2016

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB111038	28 Sep 2016	30 Sep 2016	27 Mar 2017	05 Oct 2016	27 Mar 2017	06 Oct 2016
M3	SE157659.002	LB111038	28 Sep 2016	30 Sep 2016	27 Mar 2017	05 Oct 2016	27 Mar 2017	06 Oct 2016
QC22	SE157659.003	LB111038	28 Sep 2016	30 Sep 2016	27 Mar 2017	05 Oct 2016	27 Mar 2017	06 Oct 2016

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016
M3	SE157659.002	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016
QC22	SE157659.003	LB110969	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	05 Oct 2016

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB110965	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	10 Oct 2016
M3	SE157659.002	LB110965	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	10 Oct 2016
QC22	SE157659.003	LB110965	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	10 Oct 2016

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M2	SE157659.001	LB110965	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	10 Oct 2016
M3	SE157659.002	LB110965	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	10 Oct 2016
QC22	SE157659.003	LB110965	28 Sep 2016	30 Sep 2016	05 Oct 2016	04 Oct 2016	13 Nov 2016	10 Oct 2016

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	M2	SE157659.001	%	40 - 130%	62
	M3	SE157659.002	%	40 - 130%	64
	QC22	SE157659.003	%	40 - 130%	62

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	M2	SE157659.001	%	40 - 130%	52
	M3	SE157659.002	%	40 - 130%	68
	QC22	SE157659.003	%	40 - 130%	68
d14-p-terphenyl (Surrogate)	M2	SE157659.001	%	40 - 130%	66
	M3	SE157659.002	%	40 - 130%	86
	QC22	SE157659.003	%	40 - 130%	76

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	M2	SE157659.001	%	40 - 130%	52
	M3	SE157659.002	%	40 - 130%	68
	QC22	SE157659.003	%	40 - 130%	68
d14-p-terphenyl (Surrogate)	M2	SE157659.001	%	40 - 130%	66
	M3	SE157659.002	%	40 - 130%	86
	QC22	SE157659.003	%	40 - 130%	76
d5-nitrobenzene (Surrogate)	M2	SE157659.001	%	40 - 130%	52
	M3	SE157659.002	%	40 - 130%	66
	QC22	SE157659.003	%	40 - 130%	64

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	M2	SE157659.001	%	40 - 130%	90
	M3	SE157659.002	%	40 - 130%	91
	QC22	SE157659.003	%	40 - 130%	90
d4-1,2-dichloroethane (Surrogate)	M2	SE157659.001	%	40 - 130%	112
	M3	SE157659.002	%	40 - 130%	107
	QC22	SE157659.003	%	40 - 130%	101
d8-toluene (Surrogate)	M2	SE157659.001	%	40 - 130%	95
	M3	SE157659.002	%	40 - 130%	97
	QC22	SE157659.003	%	40 - 130%	84
Dibromofluoromethane (Surrogate)	M2	SE157659.001	%	40 - 130%	116
	M3	SE157659.002	%	40 - 130%	109
	QC22	SE157659.003	%	40 - 130%	114

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	M2	SE157659.001	%	40 - 130%	90
	M3	SE157659.002	%	40 - 130%	91
	QC22	SE157659.003	%	40 - 130%	90
d4-1,2-dichloroethane (Surrogate)	M2	SE157659.001	%	60 - 130%	112
	M3	SE157659.002	%	60 - 130%	107
	QC22	SE157659.003	%	60 - 130%	101
d8-toluene (Surrogate)	M2	SE157659.001	%	40 - 130%	95
	M3	SE157659.002	%	40 - 130%	97
	QC22	SE157659.003	%	40 - 130%	84
Dibromofluoromethane (Surrogate)	M2	SE157659.001	%	40 - 130%	116
	M3	SE157659.002	%	40 - 130%	109
	QC22	SE157659.003	%	40 - 130%	114

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB111204.001	Mercury	mg/L	0.0001	<0.0001

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB110969.001		Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
		Alpha BHC	µg/L	0.1	<0.1
		Lindane (gamma BHC)	µg/L	0.1	<0.1
		Heptachlor	µg/L	0.1	<0.1
		Aldrin	µg/L	0.1	<0.1
		Beta BHC	µg/L	0.1	<0.1
		Delta BHC	µg/L	0.1	<0.1
		Heptachlor epoxide	µg/L	0.1	<0.1
		Alpha Endosulfan	µg/L	0.1	<0.1
		Gamma Chlordane	µg/L	0.1	<0.1
		Alpha Chlordane	µg/L	0.1	<0.1
		p,p'-DDE	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Beta Endosulfan	µg/L	0.1	<0.1
		p,p'-DDD	µg/L	0.1	<0.1
		p,p'-DDT	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		Endrin aldehyde	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
		Isodrin	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	75

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB110969.001		Dichlorvos	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2
		Malathion	µg/L	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
		Bromophos Ethyl	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Azinphos-methyl	µg/L	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	72
		d14-p-terphenyl (Surrogate)	%	-	94

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB110969.001	Naphthalene	µg/L	0.1	<0.1
	2-methylnaphthalene	µg/L	0.1	<0.1
	1-methylnaphthalene	µg/L	0.1	<0.1
	Acenaphthylene	µg/L	0.1	<0.1
	Acenaphthene	µg/L	0.1	<0.1
	Fluorene	µg/L	0.1	<0.1
	Phenanthrene	µg/L	0.1	<0.1
	Anthracene	µg/L	0.1	<0.1
	Fluoranthene	µg/L	0.1	<0.1
	Pyrene	µg/L	0.1	<0.1
	Benzo(a)anthracene	µg/L	0.1	<0.1
	Chrysene	µg/L	0.1	<0.1
	Benzo(a)pyrene	µg/L	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB110969.001		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	74
		2-fluorobiphenyl (Surrogate)	%	-	72
		d14-p-terphenyl (Surrogate)	%	-	94

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB111042.001	Total Phenols	mg/L	0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB111038.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB110969.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB110965.001	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5
	Hydrocarbons	Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	106
		d4-1,2-dichloroethane (Surrogate)	%	-	103
		d8-toluene (Surrogate)	%	-	96
		Bromofluorobenzene (Surrogate)	%	-	89

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB110965.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	106
		d4-1,2-dichloroethane (Surrogate)	%	-	103
		d8-toluene (Surrogate)	%	-	96
		Bromofluorobenzene (Surrogate)	%	-	89

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157685.006	LB111204.014	Mercury	µg/L	0.0001	-0.0028	-0.0022	200	0
SE157752.009	LB111204.024	Mercury	µg/L	0.0001	0.0278	0.025	200	11

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157610.002	LB111042.004	Total Phenols	mg/L	0.01	0.03	0.03	162	0

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE157685.006	LB111038.021	Arsenic, As	µg/L	1	-0.003	-0.006	200	0
		Cadmium, Cd	µg/L	0.1	-0.001	-0.001	200	0
		Chromium, Cr	µg/L	1	-0.018	-0.013	200	0
		Copper, Cu	µg/L	1	-0.276	-0.309	200	0
		Lead, Pb	µg/L	1	0.004	-0.007	200	0
		Nickel, Ni	µg/L	1	-0.042	-0.051	200	0
		Zinc, Zn	µg/L	5	1.482	1.065	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110969.002		Heptachlor	µg/L	0.1	0.2	0.2	60 - 140	119
		Aldrin	µg/L	0.1	0.2	0.2	60 - 140	122
		Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	116
		Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	125
		Endrin	µg/L	0.1	0.2	0.2	60 - 140	104
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	107
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.15	0.15	40 - 130	97

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110969.002		Dichlorvos	µg/L	0.5	9.5	8	60 - 140	118
		Diazinon (Dimpylate)	µg/L	0.5	9.6	8	60 - 140	121
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	9.1	8	60 - 140	114
		Ethion	µg/L	0.2	9.9	8	60 - 140	124
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	74
		d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	90

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110969.002		Naphthalene	µg/L	0.1	33	40	60 - 140	82
		Acenaphthylene	µg/L	0.1	38	40	60 - 140	95
		Acenaphthene	µg/L	0.1	39	40	60 - 140	99
		Phenanthrene	µg/L	0.1	36	40	60 - 140	90
		Anthracene	µg/L	0.1	36	40	60 - 140	89
		Fluoranthene	µg/L	0.1	42	40	60 - 140	104
		Pyrene	µg/L	0.1	30	40	60 - 140	76
		Benzo(a)pyrene	µg/L	0.1	43	40	60 - 140	107
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.4	0.5	40 - 130	74
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	74
		d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	90

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB111042.002	Total Phenols	mg/L	0.01	0.23	0.25	80 - 120	92

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB111038.002	Arsenic, As	µg/L	1	20	20	80 - 120	101
	Cadmium, Cd	µg/L	0.1	22	20	80 - 120	111
	Chromium, Cr	µg/L	1	23	20	80 - 120	116
	Copper, Cu	µg/L	1	23	20	80 - 120	115
	Lead, Pb	µg/L	1	23	20	80 - 120	114
	Nickel, Ni	µg/L	1	21	20	80 - 120	106
	Zinc, Zn	µg/L	5	21	20	80 - 120	105

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110969.002		TRH C10-C14	µg/L	50	930	1200	60 - 140	78
		TRH C15-C28	µg/L	200	1200	1200	60 - 140	99
		TRH C29-C36	µg/L	200	1400	1200	60 - 140	116
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1100	1200	60 - 140	88
		TRH >C16-C34 (F3)	µg/L	500	1300	1200	60 - 140	110
		TRH >C34-C40 (F4)	µg/L	500	720	600	60 - 140	120

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110965.002	Monocyclic	Benzene	µg/L	0.5	50	45.45	60 - 140	109
	Aromatic	Toluene	µg/L	0.5	50	45.45	60 - 140	109
		Ethylbenzene	µg/L	0.5	50	45.45	60 - 140	110
		m/p-xylene	µg/L	1	100	90.9	60 - 140	110
		o-xylene	µg/L	0.5	50	45.45	60 - 140	109
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.1	5	60 - 140	103

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110965.002	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.9	5	60 - 140	98
		d8-toluene (Surrogate)	µg/L	-	4.9	5	60 - 140	99
		Bromofluorobenzene (Surrogate)	µg/L	-	4.6	5	60 - 140	92

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB110965.002		TRH C6-C10	µg/L	50	940	946.63	60 - 140	100
		TRH C6-C9	µg/L	40	770	818.71	60 - 140	94
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.8	5	60 - 140	96
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.1	5	60 - 140	102
		d8-toluene (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		Bromofluorobenzene (Surrogate)	µg/L	-	5.2	5	60 - 140	104
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	640	639.67	60 - 140	100

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157659.001	LB111204.004	Mercury	mg/L	0.0001	0.0069	<0.0001	0.008	86

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157687.002	LB111042.010	Total Phenols	mg/L	0.01	0.24	0.01363	0.25	92

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE157659.001	LB111038.004	Arsenic, As	µg/L	1	22	<1	20	110
		Cadmium, Cd	µg/L	0.1	24	1.3	20	112
		Chromium, Cr	µg/L	1	22	<1	20	111
		Copper, Cu	µg/L	1	24	4	20	104
		Lead, Pb	µg/L	1	22	<1	20	110
		Nickel, Ni	µg/L	1	39	20	20	94
		Zinc, Zn	µg/L	5	83	67	20	82

MATRIX SPIKE DUPLICATES

SE157659 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover tthe performance of this service.
-	Sample not analysed for this analyte.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	SMEC	Project Name/No:	3002523 – Canberra Brickworks
Address:	Suite 2, Level 1, 243 Northbourne Avenue, Lyneham, ACT, 2602, Australia	Purchase Order No:	
		Results Required By:	Ryan O'Leary
		Telephone:	+61 2 6234 1963 / 0400 240 023
Contact Name:	Ryan O'Leary	Facsimile:	
		Email Results:	Ryan.O'Leary@smec.com; Graham.Ohmsen@smec.com

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL		NO OF CONTAINERS	BTEXN	OPPs	OCPs	PAHs/Phenols	8H Metals - As, Cd, Cr, Cu, Ni, Pb, Zn, Hg	TPH/TRH					Comment
M4	17/10/16	1	✓			5	√	√	√	√	√	√					
M5	17/10/16	2	✓			5	√	√	√	√	√	√					
M6	17/9/16	3	✓			5	√	√	√	√	√	√					
M7	17/10/16	4	✓			5	√	√	√	√	√	√					

SGS EHS Alexandria Laboratory

SE158210 COC
Received: 19 – Oct – 2016

Relinquished By: Ryan O'Leary	Date/Time: 18/10/2016 10:00	Received By:	Date/Time 19/10/16 @ 11:20
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: Yes/ No	Temperature: Ambient / Chilled	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No:
	Comments: AS PER SGS QUOTE NUMBER SY1 – 60413 – 2-IS DATED 13TH APRIL 2016 **Laboratory to filter metals and report as dissolved**	**STANDARD TAT PLEASE (5 DAY)**	

SAMPLE RECEIPT ADVICE

SE158210

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
Facsimile	02 6234 1966
Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 19/10/2016
Report Due	Wed 26/10/2016
SGS Reference	**SE158210**

SUBMISSION DETAILS

This is to confirm that 4 samples were received on Wednesday 19/10/2016. Results are expected to be ready by Wednesday 26/10/2016.
Please quote SGS reference SE158210 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	4 Water	Type of documentation received	COC
Date documentation received	19/10/2016	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	17.3°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE158210

CLIENT DETAILS

Client SMEC AUSTRALIA PTY LTD

Project 3002523 - Canberra Brickworks

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Water	OP Pesticides in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	Total Phenolics in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	M4	28	13	22	1	7	9	12	8
002	M5	28	13	22	1	7	9	12	8
003	M6	28	13	22	1	7	9	12	8
004	M7	28	13	22	1	7	9	12	8

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE158210

CLIENT DETAILS

Client SMEC AUSTRALIA PTY LTD

Project 3002523 - Canberra Brickworks

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water
001	M4	1
002	M5	1
003	M6	1
004	M7	1

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
Facsimile	02 6234 1966
Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE158210 R0**
Date Received	19/10/2016
Date Reported	26/10/2016

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

VOCs in Water [AN433] Tested: 20/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	**1.1**
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3	<3
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 20/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
TRH C6-C9	µg/L	40	<40	<40	<40	<40
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5	**1.1**
TRH C6-C10	µg/L	50	<50	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 20/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
TRH C10-C14	µg/L	50	<50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200
TRH >C10-C16 (F2)	µg/L	60	<60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500
TRH C10-C36	µg/L	450	<450	<450	<450	<450
TRH C10-C40	µg/L	650	<650	<650	<650	<650

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 20/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1	<1

OC Pesticides in Water [AN400/AN420] Tested: 20/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1	<0.1	<0.1

OP Pesticides in Water [AN400/AN420] Tested: 20/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
Dichlorvos	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2	<0.2	<0.2	<0.2

Total Phenolics in Water [AN289] Tested: 24/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
Total Phenols	mg/L	0.01	<0.01	<0.01	<0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 20/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
Arsenic, As	µg/L	1	<1	<1	<1	<1
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	**0.2**	**0.2**
Chromium, Cr	µg/L	1	<1	<1	<1	<1
Copper, Cu	µg/L	1	**1**	**2**	**1**	**1**
Lead, Pb	µg/L	1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	**2**	**1**	**13**	**12**
Zinc, Zn	µg/L	5	<5	<5	**18**	**8**

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 25/10/2016

PARAMETER	UOM	LOR	M4 WATER - 17/10/2016 SE158210.001	M5 WATER - 17/10/2016 SE158210.002	M6 WATER - 17/10/2016 SE158210.003	M7 WATER - 17/10/2016 SE158210.004
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is not corrected for Naphthalene.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE158210 R0

CLIENT DETAILS

Contact	Ryan O'Leary
Client	SMEC AUSTRALIA PTY LTD
Address	Sun Micro Building Suite 2, Level 1 243 Northbourne Avenue ACT 2602
Telephone	02 6234 1963
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Email	Ryan.O'Leary@smec.com
Project	**3002523 - Canberra Brickworks**
Order Number	**SY1-60413-2-IS**
Samples	4

LABORATORY DETAILS

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SGS Reference	**SE158210 R0**
Date Received	19 Oct 2016
Date Reported	26 Oct 2016

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SE158210 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112338	17 Oct 2016	19 Oct 2016	14 Nov 2016	25 Oct 2016	14 Nov 2016	25 Oct 2016
M5	SE158210.002	LB112338	17 Oct 2016	19 Oct 2016	14 Nov 2016	25 Oct 2016	14 Nov 2016	25 Oct 2016
M6	SE158210.003	LB112338	17 Oct 2016	19 Oct 2016	14 Nov 2016	25 Oct 2016	14 Nov 2016	25 Oct 2016
M7	SE158210.004	LB112338	17 Oct 2016	19 Oct 2016	14 Nov 2016	25 Oct 2016	14 Nov 2016	25 Oct 2016

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M5	SE158210.002	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M6	SE158210.003	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M7	SE158210.004	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M5	SE158210.002	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M6	SE158210.003	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M7	SE158210.004	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M5	SE158210.002	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M6	SE158210.003	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M7	SE158210.004	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112243	17 Oct 2016	19 Oct 2016	14 Nov 2016	24 Oct 2016	14 Nov 2016	24 Oct 2016
M5	SE158210.002	LB112243	17 Oct 2016	19 Oct 2016	14 Nov 2016	24 Oct 2016	14 Nov 2016	24 Oct 2016
M6	SE158210.003	LB112243	17 Oct 2016	19 Oct 2016	14 Nov 2016	24 Oct 2016	14 Nov 2016	24 Oct 2016
M7	SE158210.004	LB112243	17 Oct 2016	19 Oct 2016	14 Nov 2016	24 Oct 2016	14 Nov 2016	24 Oct 2016

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112043	17 Oct 2016	19 Oct 2016	15 Apr 2017	20 Oct 2016	15 Apr 2017	21 Oct 2016
M5	SE158210.002	LB112043	17 Oct 2016	19 Oct 2016	15 Apr 2017	20 Oct 2016	15 Apr 2017	21 Oct 2016
M6	SE158210.003	LB112043	17 Oct 2016	19 Oct 2016	15 Apr 2017	20 Oct 2016	15 Apr 2017	21 Oct 2016
M7	SE158210.004	LB112043	17 Oct 2016	19 Oct 2016	15 Apr 2017	20 Oct 2016	15 Apr 2017	21 Oct 2016

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M5	SE158210.002	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M6	SE158210.003	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016
M7	SE158210.004	LB112045	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	25 Oct 2016

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M5	SE158210.002	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M6	SE158210.003	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M7	SE158210.004	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
M4	SE158210.001	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M5	SE158210.002	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M6	SE158210.003	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016
M7	SE158210.004	LB112089	17 Oct 2016	19 Oct 2016	24 Oct 2016	20 Oct 2016	29 Nov 2016	26 Oct 2016

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	M4	SE158210.001	%	40 - 130%	56
	M5	SE158210.002	%	40 - 130%	51
	M6	SE158210.003	%	40 - 130%	52
	M7	SE158210.004	%	40 - 130%	55

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	M4	SE158210.001	%	40 - 130%	54
	M5	SE158210.002	%	40 - 130%	64
	M6	SE158210.003	%	40 - 130%	62
	M7	SE158210.004	%	40 - 130%	68
d14-p-terphenyl (Surrogate)	M4	SE158210.001	%	40 - 130%	102
	M5	SE158210.002	%	40 - 130%	98
	M6	SE158210.003	%	40 - 130%	102
	M7	SE158210.004	%	40 - 130%	74

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	M4	SE158210.001	%	40 - 130%	54
	M5	SE158210.002	%	40 - 130%	64
	M6	SE158210.003	%	40 - 130%	62
	M7	SE158210.004	%	40 - 130%	68
d14-p-terphenyl (Surrogate)	M4	SE158210.001	%	40 - 130%	102
	M5	SE158210.002	%	40 - 130%	98
	M6	SE158210.003	%	40 - 130%	102
	M7	SE158210.004	%	40 - 130%	74
d5-nitrobenzene (Surrogate)	M4	SE158210.001	%	40 - 130%	44
	M5	SE158210.002	%	40 - 130%	54
	M6	SE158210.003	%	40 - 130%	54
	M7	SE158210.004	%	40 - 130%	54

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	M4	SE158210.001	%	40 - 130%	90
	M5	SE158210.002	%	40 - 130%	91
	M6	SE158210.003	%	40 - 130%	91
	M7	SE158210.004	%	40 - 130%	93
d4-1,2-dichloroethane (Surrogate)	M4	SE158210.001	%	40 - 130%	114
	M5	SE158210.002	%	40 - 130%	110
	M6	SE158210.003	%	40 - 130%	102
	M7	SE158210.004	%	40 - 130%	104
d8-toluene (Surrogate)	M4	SE158210.001	%	40 - 130%	90
	M5	SE158210.002	%	40 - 130%	91
	M6	SE158210.003	%	40 - 130%	86
	M7	SE158210.004	%	40 - 130%	76
Dibromofluoromethane (Surrogate)	M4	SE158210.001	%	40 - 130%	116
	M5	SE158210.002	%	40 - 130%	114
	M6	SE158210.003	%	40 - 130%	111
	M7	SE158210.004	%	40 - 130%	108

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	M4	SE158210.001	%	40 - 130%	90
	M5	SE158210.002	%	40 - 130%	91
	M6	SE158210.003	%	40 - 130%	91
	M7	SE158210.004	%	40 - 130%	93
d4-1,2-dichloroethane (Surrogate)	M4	SE158210.001	%	60 - 130%	114
	M5	SE158210.002	%	60 - 130%	110
	M6	SE158210.003	%	60 - 130%	102
	M7	SE158210.004	%	60 - 130%	104
d8-toluene (Surrogate)	M4	SE158210.001	%	40 - 130%	90
	M5	SE158210.002	%	40 - 130%	91
	M6	SE158210.003	%	40 - 130%	86

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	M7	SE158210.004	%	40 - 130%	76
Dibromofluoromethane (Surrogate)	M4	SE158210.001	%	40 - 130%	116
	M5	SE158210.002	%	40 - 130%	114
	M6	SE158210.003	%	40 - 130%	111
	M7	SE158210.004	%	40 - 130%	108

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB112338.001	Mercury	mg/L	0.0001	<0.0001

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB112045.001		Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
		Alpha BHC	µg/L	0.1	<0.1
		Lindane (gamma BHC)	µg/L	0.1	<0.1
		Heptachlor	µg/L	0.1	<0.1
		Aldrin	µg/L	0.1	<0.1
		Beta BHC	µg/L	0.1	<0.1
		Delta BHC	µg/L	0.1	<0.1
		Heptachlor epoxide	µg/L	0.1	<0.1
		Alpha Endosulfan	µg/L	0.1	<0.1
		Gamma Chlordane	µg/L	0.1	<0.1
		Alpha Chlordane	µg/L	0.1	<0.1
		p,p'-DDE	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Beta Endosulfan	µg/L	0.1	<0.1
		p,p'-DDD	µg/L	0.1	<0.1
		p,p'-DDT	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		Endrin aldehyde	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
		Isodrin	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	74

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB112045.001		Dichlorvos	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2
		Malathion	µg/L	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
		Bromophos Ethyl	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Azinphos-methyl	µg/L	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	68
		d14-p-terphenyl (Surrogate)	%	-	96

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB112045.001	Naphthalene	µg/L	0.1	<0.1
	2-methylnaphthalene	µg/L	0.1	<0.1
	1-methylnaphthalene	µg/L	0.1	<0.1
	Acenaphthylene	µg/L	0.1	<0.1
	Acenaphthene	µg/L	0.1	<0.1
	Fluorene	µg/L	0.1	<0.1
	Phenanthrene	µg/L	0.1	<0.1
	Anthracene	µg/L	0.1	<0.1
	Fluoranthene	µg/L	0.1	<0.1
	Pyrene	µg/L	0.1	<0.1
	Benzo(a)anthracene	µg/L	0.1	<0.1
	Chrysene	µg/L	0.1	<0.1
	Benzo(a)pyrene	µg/L	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB112045.001		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	96
		2-fluorobiphenyl (Surrogate)	%	-	84
		d14-p-terphenyl (Surrogate)	%	-	114

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB112243.001	Total Phenols	mg/L	0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB112043.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB112045.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB112089.001	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5
	Hydrocarbons	Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	106
		d4-1,2-dichloroethane (Surrogate)	%	-	106
		d8-toluene (Surrogate)	%	-	101
		Bromofluorobenzene (Surrogate)	%	-	97

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB112089.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	106
		d4-1,2-dichloroethane (Surrogate)	%	-	106
		d8-toluene (Surrogate)	%	-	101
		Bromofluorobenzene (Surrogate)	%	-	97

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE158209.001	LB112338.014	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE158210.001	LB112243.004	Total Phenols	mg/L	0.01	<0.01	<0.01	200	0

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE158225.001	LB112043.009	Arsenic, As	µg/L	1	2	2	59	2
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	2	2	58	1
		Copper, Cu	µg/L	1	2	2	79	2
		Lead, Pb	µg/L	1	2	2	64	3
		Nickel, Ni	µg/L	1	2	2	58	0
		Zinc, Zn	µg/L	5	9	8	75	14

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112045.002		Heptachlor	µg/L	0.1	0.2	0.2	60 - 140	109
		Aldrin	µg/L	0.1	0.2	0.2	60 - 140	100
		Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	112
		Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	104
		Endrin	µg/L	0.1	0.2	0.2	60 - 140	102
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	123
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.12	0.15	40 - 130	77

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112045.002		Dichlorvos	µg/L	0.5	7.0	8	60 - 140	88
		Diazinon (Dimpylate)	µg/L	0.5	6.7	8	60 - 140	83
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	7.1	8	60 - 140	89
		Ethion	µg/L	0.2	6.4	8	60 - 140	80
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	66
		d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	106

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112045.002		Naphthalene	µg/L	0.1	28	40	60 - 140	70
		Acenaphthylene	µg/L	0.1	32	40	60 - 140	79
		Acenaphthene	µg/L	0.1	29	40	60 - 140	74
		Phenanthrene	µg/L	0.1	33	40	60 - 140	82
		Anthracene	µg/L	0.1	40	40	60 - 140	100
		Fluoranthene	µg/L	0.1	35	40	60 - 140	88
		Pyrene	µg/L	0.1	45	40	60 - 140	112
		Benzo(a)pyrene	µg/L	0.1	36	40	60 - 140	89
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.5	0.5	40 - 130	106
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	64
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	88

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112243.002	Total Phenols	mg/L	0.01	0.23	0.25	80 - 120	93

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112043.002	Arsenic, As	µg/L	1	20	20	80 - 120	102
	Cadmium, Cd	µg/L	0.1	21	20	80 - 120	104
	Chromium, Cr	µg/L	1	21	20	80 - 120	107
	Copper, Cu	µg/L	1	22	20	80 - 120	109
	Lead, Pb	µg/L	1	22	20	80 - 120	109
	Nickel, Ni	µg/L	1	21	20	80 - 120	106
	Zinc, Zn	µg/L	5	21	20	80 - 120	107

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112045.002		TRH C10-C14	µg/L	50	940	1200	60 - 140	78
		TRH C15-C28	µg/L	200	1200	1200	60 - 140	102
		TRH C29-C36	µg/L	200	1300	1200	60 - 140	111
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1100	1200	60 - 140	90
		TRH >C16-C34 (F3)	µg/L	500	1300	1200	60 - 140	109
		TRH >C34-C40 (F4)	µg/L	500	690	600	60 - 140	115

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112089.002	Monocyclic	Benzene	µg/L	0.5	50	45.45	60 - 140	111
	Aromatic	Toluene	µg/L	0.5	50	45.45	60 - 140	111
		Ethylbenzene	µg/L	0.5	51	45.45	60 - 140	112
		m/p-xylene	µg/L	1	100	90.9	60 - 140	111
		o-xylene	µg/L	0.5	51	45.45	60 - 140	112
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.6	5	60 - 140	92

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112089.002	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.5	5	60 - 140	90
		d8-toluene (Surrogate)	µg/L	-	4.7	5	60 - 140	94
		Bromofluorobenzene (Surrogate)	µg/L	-	5.0	5	60 - 140	101

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB112089.002		TRH C6-C10	µg/L	50	930	946.63	60 - 140	98
		TRH C6-C9	µg/L	40	750	818.71	60 - 140	91
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.6	5	60 - 140	92
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.5	5	60 - 140	90
		d8-toluene (Surrogate)	µg/L	-	4.7	5	60 - 140	94
		Bromofluorobenzene (Surrogate)	µg/L	-	5.0	5	60 - 140	101
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	620	639.67	60 - 140	97

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE158209.002	LB112338.016	Mercury	mg/L	0.0001	0.0080	<0.0001	0.008	100

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE158199.001	LB112243.010	Total Phenols	mg/L	0.01	0.23	0.01	0.25	89

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE158210.001	LB112043.004	Arsenic, As	µg/L	1	22	<1	20	110
		Cadmium, Cd	µg/L	0.1	21	<0.1	20	105
		Chromium, Cr	µg/L	1	22	<1	20	107
		Copper, Cu	µg/L	1	22	1	20	103
		Lead, Pb	µg/L	1	21	<1	20	106
		Nickel, Ni	µg/L	1	22	2	20	102
		Zinc, Zn	µg/L	5	22	<5	20	102

MATRIX SPIKE DUPLICATES

SE158210 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover tthe performance of this service.
-	Sample not analysed for this analyte.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name: SMEC
Address: Suite 2, Level 1, 243 Northbourne Avenue, Lyneham, ACT, 2602, Australia
Contact Name: Ryan O'Leary

Project Name/No: 3002523 – Canberra Brickworks
Purchase Order No:
Results Required By: Ryan O'Leary
Telephone: +61 2 6234 1963 / 0400 240 023
Facsimile:
Email Results: Ryan.O'Leary@smec.com

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL		NO OF CONTAINERS	BTEXN	OPPs	OCPs	PAHs/Phenols	8H Metals - As, Cd, Cr, Cu, Ni, Pb, Zn, Hg	TPH/TRH	Comment
M2	28/9/2016		✓			5	√	√	√	√	√	√	
M3	28/9/2016		✓			5	√	√	√	√	√	√	
QC22	28/9/2016		✓			5	√	√	√	√	√	√	
QC23	28/9/2016		✓			5	√	√	√	√	√	√	Please send to ALS Sydney

Environmental Division
Sydney
Work Order Reference
ES1622123
Telephone : + 61-2-8784 8555

(1)

Relinquished By: Ryan O'Leary
Date/Time: 29/9/2016 16:00
Received By: Jessie
Date/Time 30/9/16 15:50

Relinquished By:
Date/Time:
Received By:
Date/Time 30/9/16 @ 10:00

Samples Intact: Yes/ No
Temperature: Ambient / Chilled 16.9
Sample Cooler Sealed: Yes/ No
Laboratory Quotation No:

Comments: AS PER SGS QUOTE NUMBER SY1 – 60413 – 2-IS DATED 13TH APRIL 2016
Laboratory to filter metals and report as dissolved

STANDARD TAT PLEASE (5 DAY)

confirmed total Phenols as per Ryan. 4/10/16 cwe.

ES1622123

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1622123**

Client	: **SMEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: RYAN O'LEARY	Contact	:
Address	: P O BOX 1654 FYSHWICK ACT, AUSTRALIA 2609	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ryan.o'leary@smec.com	E-mail	:
Telephone	: +61 02 9925 5555	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9925 5566	Facsimile	: +61-2-8784 8500
Project	: 3002523 - CANBERRA BRICKWORKS	Page	: 1 of 2
Order number	: ----	Quote number	: ES2015SMEAUS0024 (EN/025/15)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 30-Sep-2016 3:50 PM	Issue Date	: 04-Oct-2016
Client Requested Due Date	: 10-Oct-2016	Scheduled Reporting Date	: **10-Oct-2016**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not intact.
No. of coolers/boxes	: ----	Temperature	: 1.0' C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

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

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP035G Total Phenol by Discrete Analyser	WATER - W-12 OC/OP Pesticides	WATER - W-26 TRH/BTEXN/PAH/8 Metals
ES1622123-001	[28-Sep-2016]	QC23	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

RYAN O'LEARY

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1622123**	Page	: 1 of 7
Client	: **SMEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: RYAN O'LEARY	Contact	:
Address	: P O BOX 1654 FYSHWICK ACT, AUSTRALIA 2609	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9925 5555	Telephone	: +61-2-8784 8555
Project	: 3002523 - CANBERRA BRICKWORKS	Date Samples Received	: 30-Sep-2016 15:50
Order number	: ----	Date Analysis Commenced	: 04-Oct-2016
C-O-C number	: ----	Issue Date	: 10-Oct-2016 16:08
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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

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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QC23	----	----	----	----
				Client sampling date / time	[28-Sep-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1622123-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		**0.0014**	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.005**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.020**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.072**	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP035G: Total Phenol by Discrete Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2	µg/L		<2.0	----	----	----	----
^ **Total Chlordane (sum)**	----	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QC23	----	----	----	----
				Client sampling date / time	[28-Sep-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1622123-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----
Parathion	56-38-2	2	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1	µg/L		<1.0	----	----	----	----
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	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QC23	----	----	----	----
				Client sampling date / time	[28-Sep-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1622123-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**113**	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)				Client sample ID	QC23	----	----	----	----
				Client sampling date / time	[28-Sep-2016]	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**ES1622123-001**	--------	--------	--------	--------
					Result	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**117**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**25.8**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		**60.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1	%		**44.0**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**75.9**	----	----	----	----
Anthracene-d10	1719-06-8	1	%		**71.4**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		**84.1**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**110**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**115**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**111**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	30	120
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27	129
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1622123**	Page	: 1 of 7
Client	: **SMEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: RYAN O'LEARY	Contact	:
Address	: P O BOX 1654 FYSHWICK ACT, AUSTRALIA 2609	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9925 5555	Telephone	: +61-2-8784 8555
Project	: 3002523 - CANBERRA BRICKWORKS	Date Samples Received	: 30-Sep-2016
Order number	: ----	Date Analysis Commenced	: 04-Oct-2016
C-O-C number	: ----	Issue Date	: 10-Oct-2016
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 608766)									
ES1622054-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0004	0.0003	34.2	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.023	0.023	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.025	0.025	0.00	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.269	0.267	0.924	0% - 20%
ES1622287-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.106	0.117	9.42	0% - 50%
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.011	<0.010	10.2	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	4.43	4.80	7.92	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 608765)									
ES1622059-108	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1622054-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP035G: Total Phenol by Discrete Analyser (QC Lot: 606179)									
EP1609290-001	Anonymous	EP035G: Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1622162-001	Anonymous	EP035G: Phenols (Total)	----	0.05	mg/L	<0.05	0.30	143	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 608112)									
ES1622090-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1622090-019	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 608112)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 608112) - continued									
ES1622090-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1622090-019	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 608112)									
ES1622090-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1622090-019	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 608766)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	85	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.8	85	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.8	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.8	83	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.4	82	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.2	81	117
EG035F: Dissolved Mercury by FIMS (QCLot: 608765)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.7	83	105
EP035G: Total Phenol by Discrete Analyser (QCLot: 606179)								
EP035G: Phenols (Total)	----	0.05	mg/L	<0.05	0.5 mg/L	85.0	64	98
EP068A: Organochlorine Pesticides (OC) (QCLot: 604843)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	87.1	65	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	83.6	54	114
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	88.3	69	117
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	88.4	70	112
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	92.5	67	117
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	88.7	63	113
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	93.5	66	116
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	97.8	59	123
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	100	61	121
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	101	66	120
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	100	64	120
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	102	66	120
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	106	67	119
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	95.1	66	122
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	104	71	119
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	107	72	122
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	97.3	64	116
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	95.4	60	126
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	82.8	60	122
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	97.7	62	124
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	89.8	53	127
EP068B: Organophosphorus Pesticides (OP) (QCLot: 604843)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 604843) - continued								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	97.4	69	119
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	97.0	62	124
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	24.5	20	48
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	97.8	65	121
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	97.9	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	91.0	77	119
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	86.7	70	124
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	104	70	124
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	101	68	122
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	103	75	1196
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	94.1	67	121
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	104	69	121
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	99.3	69	119
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	103	63	125
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	106	69	125
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	107	61	111231
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	108	74	120
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	98.9	68	124
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	90.7	44	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 604842)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	66.0	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	70.2	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	72.2	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	70.0	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	88.6	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	84.8	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	85.9	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	96.3	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	70.8	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	87.8	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	71.4	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	83.0	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	76.9	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	77.2	60	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	77.4	61	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	75.5	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 604841)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	94.2	76	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 604841) - continued								
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	99.5	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	93.7	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 608112)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	83.2	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 604841)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	99.4	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	95.3	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	101	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 608112)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	86.9	75	127
EP080: BTEXN (QCLot: 608112)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	88.6	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	89.1	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.4	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	89.4	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	88.0	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	100	70	120

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 608766)							
ES1622054-003	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	107	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	107	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	102	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	104	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	104	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	98.8	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	108	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 608765)							
ES1622054-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	88.7	70	130
EP035G: Total Phenol by Discrete Analyser (QCLot: 606179)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP035G: Total Phenol by Discrete Analyser (QCLot: 606179) - continued							
EP1609290-001	Anonymous	EP035G: Phenols (Total)	----	0.42 mg/L	86.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 608112)							
ES1622090-006	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	84.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 608112)							
ES1622090-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	85.4	70	130
EP080: BTEXN (QCLot: 608112)							
ES1622090-006	Anonymous	EP080: Benzene	71-43-2	25 µg/L	76.8	70	130
		EP080: Toluene	108-88-3	25 µg/L	84.2	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	91.1	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	89.3	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	92.3	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	91.4	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1622123**	Page	: 1 of 5
Client	: **SMEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: RYAN O'LEARY	Telephone	: +61-2-8784 8555
Project	: 3002523 - CANBERRA BRICKWORKS	Date Samples Received	: 30-Sep-2016
Site	: ----	Issue Date	: 10-Oct-2016
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	12	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	8	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	12	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: **WATER**

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

Method / ***Container*** / Client Sample ID(s)	***Sample Date***	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
QC23	**28-Sep-2016**	**----**	----	----	**07-Oct-2016**	27-Mar-2017	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
QC23	**28-Sep-2016**	**----**	----	----	**10-Oct-2016**	26-Oct-2016	✓
EP035G: Total Phenol by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EP035G)							
QC23	**28-Sep-2016**	**05-Oct-2016**	26-Oct-2016	✓	**05-Oct-2016**	26-Oct-2016	✓
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
QC23	**28-Sep-2016**	**04-Oct-2016**	05-Oct-2016	✓	**06-Oct-2016**	13-Nov-2016	✓
EP068B: Organophosphorus Pesticides (OP)							
Amber Glass Bottle - Unpreserved (EP068)							
QC23	**28-Sep-2016**	**04-Oct-2016**	05-Oct-2016	✓	**06-Oct-2016**	13-Nov-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC23	**28-Sep-2016**	**04-Oct-2016**	05-Oct-2016	✓	**06-Oct-2016**	13-Nov-2016	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
QC23	**28-Sep-2016**	**04-Oct-2016**	05-Oct-2016	✓	**06-Oct-2016**	13-Nov-2016	✓
Clear glass VOC vial - HCl (EP080)							
QC23	**28-Sep-2016**	**07-Oct-2016**	12-Oct-2016	✓	**07-Oct-2016**	12-Oct-2016	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
QC23	**28-Sep-2016**	**04-Oct-2016**	05-Oct-2016	✓	**06-Oct-2016**	13-Nov-2016	✓
Clear glass VOC vial - HCl (EP080)							
QC23	**28-Sep-2016**	**07-Oct-2016**	12-Oct-2016	✓	**07-Oct-2016**	12-Oct-2016	✓
EP080: BTEXN							
Clear glass VOC vial - HCl (EP080)							
QC23	**28-Sep-2016**	**07-Oct-2016**	12-Oct-2016	✓	**07-Oct-2016**	12-Oct-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: **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)							
Dissolved Mercury by FIMS	EG035F	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	1	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Discrete Analyser	EP035G	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	12	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Discrete Analyser	EP035G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Discrete Analyser	EP035G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Discrete Analyser	EP035G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	12	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Phenol by Discrete Analyser	EP035G	WATER	In house: Referenced to APHA 5530 B&D. Steam distillable Phenols are reacted with 4-aminoantipyrine. The resultant colour intensity is measured by Seal. This method is compliant with NEPM (2013) Schedule B(3)
Pesticides by GCMS	EP068	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Phenols After Microdistillation	EP035D	WATER	In house: Referenced to APHA 5530 A, B&D pH adjusted Steam distillable Phenolic compounds. The resultant colour intensity is measured by Discrete Analyser.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

APPENDIX E – CALIBRATION CERTIFICATES

Oil / Water Interface Meter

Instrument Geotech Interface Meter (60M)
Serial No. 4427

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: **Jiayi Fu**

Calibration date: **12/09/2016**

Next calibration due: **11/11/2016**

ThermoFisher SCIENTIFIC

The world leader in serving science

RENTALS

Equipment Certification Report – TPS 90FLMV Water Quality Meter

This Water Quality Meter has been performance checked and calibrated as follows:

Sensor	Concentration	Span 1	Span 2	Traceability Lot #	Pass?
pH	pH 7.00 / pH 4.00	7.00 pH	4.00 pH	/	☑
Conductivity	12.88mS/cm	0 mS/cm	12.88 mS/cm		☑
TDS	36 ppk	0 ppk	36 ppk		☑
Dissolved Oxygen	Sodium Sulphite / Air	0 ppm in Sodium Sulphite	8.55 ppm Saturation in Air		☑

Check only

Redox (ORP) *	Electrode operability test	240mV +/- 10%	240 mV		☑

* This meter uses an Ag/AgCl ORP electrode. To convert readings to SHE (Standard Hydrogen Electrode), add 199mV to the mV reading.

☑ Battery Status 8.1 V (min 7.2V)
☑ Electrical Safety Tag attached (AS/NZS 3760)

☑ Temperature 22.7 °C
☑ Electrodes Cleaned and checked

Tag No: 000813

Valid to: 8/11/16

Date: 19/09/2016

Signed: _____

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	90FLMV Unit. Ops check/Battery status: 8.1V
☑	☐	pH sensor with wetting cap, 5m
☑	☐	Conductivity/TDS/Temperature K=10 sensor, 5m
☑	☐	Dissolved oxygen YSI5739 sensor with wetting cap, 5m
☑	☐	Redox (ORP) sensor with wetting cap, 5m
☑	☐	Power supply 240V to 12V DC 200mA
☑	☐	Instruction Manual
☑	☐	Quick Guide
☑	☐	Syringe with storage solution for pH and ORP sensors
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 19/09/2016

Signed: _____

TFS Reference	CS005491	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	90FLMVSK	Condition on return:	
Equipment Serial No.	T0798		

Appendix F - WELL DEVELOPMENT AND GROUNDWATER SAMPLING SHEETS

Well Development Sheet

Project Number: 3002523		Project Location: Canberra Brickworks		Sampler: Ryan O'Leary and Jaeger Swanepoel	
Date	**Location**	**Depth to water (m)**	**Total depth (m)**	**Litres purged**	**Comment**
22/09/2016	M1	Dry	8.311	Dry	
22/09/2016	M2	4.091	14.529	25	
22/09/2016	M3	2.741	4.757	3.9	
06/10/2016	M4	1.198	4.815	7.1	
22/09/2016	M5	1.965	4.870	5.7	Water was brown in colour.
22/09/2016	M6	10.547	15.670	10.1	Water is quite clear, slightly turbid.
22/09/2016	M7	15.102	8.565	12.8	
06/10/2016	M8	Dry	15.104	Dry	

Groundwater Sampling Sheet

Well ID: M1

PROJECT NAME: Canberra Brickworks	PURGE DATE: 17/10/16 Dry 15:30
PROJECT NUMBER: 3002523	DATE SAMPLED: Dry 17/10/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 8.311
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): Dry
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): Dry
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☐

Comment:

Purge Start Time (2400 hr):

Estimated Purge Volume: Litres (3-5) Well Volumes

Actual Purge Volume: Litres

Did well purge dry? No ☐ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO ( )	Turbidity (NTU)	Temperature (°C)
After 1 purge							
After 2 purge							
After 3 purge							
After 4 purge							
After 5 purge							
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☐ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☐ Other:

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☐

Hydrocarbon Sheen? Yes ☐ No ☐

Water Colour: Odour:

Turbidity: Low ☐ Medium ☐ High ☐

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name: Purger Name:

Notes:
mBTOC = Meters below top of casing

Groundwater Sampling Sheet

Well ID: M2

PROJECT NAME: Canberra Brickworks	PURGE DATE: 28/09/16
PROJECT NUMBER: 3002523	DATE SAMPLED: 28/09/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 14.529
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): 7.531
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): -
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Comment:

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☒ Bladder pump

Purge Start Time (2400 hr): 10:10

Estimated Purge Volume: 5 Litres (3-5) Well Volumes

Actual Purge Volume: 5 Litres

Did well purge dry? No ☒ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO (ppm)	Turbidity (NTU)	Temperature (°C)
SWL 8.172 After 1 purge 1.0L	10:27	3.51	994	194	7.61	—	18.4
SWL 8.687 After 2 purge 2.0L	10:30	6.97	1002	112	3.51	—	18.2
SWL 8.957 After 3 purge 3.0L	10:33	6.69	1920	110	3.89	—	18.1
SWL 9.501 After 4 purge 4.0L	10:38	6.84	1909	103	2.43	—	18.9
SWL 9.873 After 5 purge 5.0L	10:43	6.89	1923	94	2.25	—	18.9
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☒ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☐ Other: Bladder pump

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☒

Hydrocarbon Sheen? Yes ☐ No ☒

Water Colour: Clear Odour: None

Turbidity: Low ☒ Medium ☐ High ☐

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name: RO

Purger Name: RO

Notes:
mBTOC = Meters below top of casing

Groundwater Sampling Sheet

Well ID: M3

PROJECT NAME: Canberra Brickworks	PURGE DATE: 28/09/16
PROJECT NUMBER: 3002523	DATE SAMPLED: 28/09/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 4.757
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): 3.006
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): -
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☒ Bladder

Comment:

Purge Start Time (2400 hr):

Estimated Purge Volume: 3 Litres (3-5) Well Volumes

Actual Purge Volume: 3 Litres

Did well purge dry? No ☒ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO (ppm)	Turbidity (NTU)	Temperature (°C)
SWL 3.152 After 1 purge 1.0L	13:54	6.03	795	142	9.62	✓	16.7
SWL 3.263 After 2 purge 2.0L	13:59	5.93	832	142	9.24	✓	16.8
SWL 3.408 After 3 purge 3.0L	14:04	5.94	887	142	9.17	✓	16.6
After 4 purge							
After 5 purge							
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☒ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☐ Other: Bladder pump

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☒

Hydrocarbon Sheen? Yes ☐ No ☒

Water Colour: Clear Odour: None

Turbidity: Low ☒ Medium ☐ High ☐

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name: RO

Purger Name: RO

Notes:
mBTOC = Meters below top of casing

Groundwater Sampling Sheet

Well ID: M4

PROJECT NAME: Canberra Brickworks	PURGE DATE: 17/10/16
PROJECT NUMBER: 3002523	DATE SAMPLED: 17/10/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 4.815
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): 1.906
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): -
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Comment:

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☒ Bladder Pump

Purge Start Time (2400 hr): 14.30

Estimated Purge Volume: 4 Litres (3-5) Well Volumes

Actual Purge Volume: 4 Litres

Did well purge dry? No ☒ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO (ppm)	Turbidity (NTU)	Temperature (°C)
SWL 1.920 After 1 purge 1.0L	14:40	6.63	230	114	7.82	✓	17.2
SWL 1.922 After 2 purge 2.0L	14:44	6.61	347	115	3.06	✓	16.0
SWL 1.926 After 3 purge 3.0L	14:48	6.61	632	115	3.00	✓	15.6
SWL 1.932 After 4 purge 4.0L	14:52	6.60	633	145	2.94	✓	15.5
After 5 purge							
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☒ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☐ Other: Bladder pump

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☒

Hydrocarbon Sheen? Yes ☐ No ☒

Water Colour: Brown Odour: None

Turbidity: Low ☐ Medium ☐ High ☒

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name: RO

Purger Name: RO

Notes:
mBTOC = Meters below top of casing

Groundwater Sampling Sheet

Well ID: MS

PROJECT NAME: Canberra Brickworks	PURGE DATE: 17/10/16
PROJECT NUMBER: 3002523	DATE SAMPLED: 17/10/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 4.870
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): 1.965
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): —
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Comment:

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☒ Bladder Pump

Purge Start Time (2400 hr): 15:25

Estimated Purge Volume: 5.7 Litres (3-5) Well Volumes

Actual Purge Volume: 5.7 Litres

Did well purge dry? No ☒ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO (ppm)	Turbidity (NTU)	Temperature (°C)
SWL 2.803 After 1 purge 1.0L	15:34	6.99	446	106	3.33	/	14.5
SWL 2.817 After 2 purge 2.0L	15:36	7.01	443	102	2.99	/	14.4
SWL 2.790 After 3 purge 3.0L	15:40	6.99	440	96	2.89	/	14.4
After 4 purge							
After 5 purge							
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☒ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☒ Other: Bladder pump

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☒

Hydrocarbon Sheen? Yes ☐ No ☒

Water Colour: Brown Odour: None

Turbidity: Low ☐ Medium ☐ High ☒

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name: RO

Purger Name: RO

Notes:
mBTOC = Meters below top of casing

Groundwater Sampling Sheet

Well ID: M6

PROJECT NAME: Canberra Brickworks	PURGE DATE: 17/10/16
PROJECT NUMBER: 3002523	DATE SAMPLED: 17/10/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 15.67
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): 12.199
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): -
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Comment:

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☒ Bladder pump

Purge Start Time (2400 hr): 15:45

Estimated Purge Volume: 2 Litres (3-5) Well Volumes

Actual Purge Volume: 2 Litres

Did well purge dry? No ☒ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO (ppm)	Turbidity (NTU)	Temperature (°C)
SWL 12.459 After 1 purge 1.0L	16:00	6.96	2250	131	5.18	/	14.8
SWL 12.618 After 2 purge 2.0L	16:11	6.91	2250	129	5.30	/	15.2
After 3 purge							
After 4 purge							
After 5 purge							
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☒ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☐ Other: Bladder pump

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☒

Hydrocarbon Sheen? Yes ☐ No ☒

Water Colour: Light brown Odour: None

Turbidity: Low ☐ Medium ☐ High ☒

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name: RO

Purger Name: RO

Notes:
mBTOC = Meters below top of casing

Groundwater Sampling Sheet

Well ID: M7

PROJECT NAME: Canberra Brickworks	PURGE DATE: 17/10/16
PROJECT NUMBER: 3002523	DATE SAMPLED: 17/10/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 15.67
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): 11.600
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): -
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Comment:

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☒ Bladder pump

Purge Start Time (2400 hr): 13:40

Estimated Purge Volume: 3 Litres (3-5) Well Volumes

Actual Purge Volume: 3 Litres

Did well purge dry? No ☒ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO (ppm)	Turbidity (NTU)	Temperature (°C)
SWL 12.346 After 1 purge 1.0L	13:50	6.3	362	156	7.91	/	19.5
SWL 12.702 After 2 purge 2.0L	13:53	6.46	403	145	7.84	/	19.8
SWL 13.067 After 3 purge 3.0L	13:56	6.5	445	136	7.83	/	20.0
After 4 purge							
After 5 purge							
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☒ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☒ Other: Bladder pump

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☒

Hydrocarbon Sheen? Yes ☐ No ☒

Water Colour: Brown Odour: None

Turbidity: Low ☐ Medium ☐ High ☒

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name: RO

Purger Name: RO

Notes:
mBTOC = Meters below top of casing

Groundwater Sampling Sheet

Well ID: M8

PROJECT NAME: Canberra Brickworks	PURGE DATE: 17/10/16 Dry 15:00
PROJECT NUMBER: 3002523	DATE SAMPLED: Dry 17/10/16
CLIENT: LDA	DEPTH OF WELL (mBTOC): 15.104
WELL CASING DIAMETER (mm): 50	DEPTH TO GROUNDWATER (mBTOC): 15.096 Dry
CASING HEIGHT ABOVE GROUND LEVEL (m):	DEPTH TO BE PURGED (m): Dry
MONUMENT: ☒ GATIC COVERED: ☐ STAND PIPE: ☐	CHECKED BY: RO

GROUNDWATER PURGING INFORMATION

Purge until field parameters stabilise OR 3-5 casing volumes OR until "dry", whichever occurs first

1 casing volume = 0.5L/m for wells of 25mm diameter
1 casing volume = 2L/m for wells of 50mm diameter
1 casing volume = 8L/m for wells of 100mm diameter

Method/pump type: Bailer ☐ Submersible Pump ☐ Other: ☐

Comment:

Purge Start Time (2400 hr):

Estimated Purge Volume: Litres (3-5) Well Volumes

Actual Purge Volume: Litres

Did well purge dry? No ☐ Yes ☐ if yes, when? Litres

FIELD RESULTS

	Time (24 hr)	pH	EC (S/cm)	Redox (mV)	DO ( )	Turbidity (NTU)	Temperature (°C)
After 1 purge							
After 2 purge							
After 3 purge							
After 4 purge							
After 5 purge							
Acceptable Variation:	n/a	+/- 0.1	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 0.5

Are field results acceptable to allow sampling? Yes ☒ No ☐ If no, why?

SAMPLING DETAILS

Method: Bailer ☐ Submersible Pump ☐ Other:

Equipment: Dedicated/Disposable: ☐ Decontaminated: ☐

Hydrocarbon Sheen? Yes ☐ No ☐

Water Colour: Odour:

Turbidity: Low ☐ Medium ☐ High ☐

LABORATORY ANALYSIS DETAILS

Sample ID:	Duplicate ID:	Triplicate ID:
TPH's ☐	PAH ☐	Metals ☐
BTEX ☐	VOCs ☐	SVOC's ☐
Other:		

GENERAL ENVIRONMENTAL CONDITIONS

Temp: Cold (<5°C) ☐ Cool (<15°C) ☐ Mild (<25°C) ☐ Warm (<35°C) ☐ Hot (<45°C) ☐

Air: Dry ☐ Medium ☐ Humid ☐ Rain ☐

Wind: Still ☐ Slight Breeze ☐ Windy ☐ Strong Wind ☐

Sky: Clear ☐ Scattered ☐ Cloudy ☐

Other comments:

Sampler Name:

Purger Name:

Notes:
mBTOC = Meters below top of casing