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PYMBLE GOLF CLUB

Detailed Site Investigation

12-14 Cowan Road, St Ives NSW

Report E23975.E02_Rev01

15 March 2019

REPORT DISTRIBUTION

Detailed Site Investigation
Pymble Golf Club 4, 12-14 Cowan Road, St Ives NSW

EI Report No.: E23975.E02_Rev1
Date: 15 March 2019

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Revision	Details	Date	Amended By
0	-	14 February 2019	-
1	Updated development drawings	15 March 2019	LY

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EXECUTIVE SUMMARY

Background

Pymble Golf Club engaged EI Australia (EI) to conduct a Detailed Site Investigation (DSI) for the property located at Pymble Golf Club 4, 12-14 Cowan Road, St Ives ('the site'). EI understand that this investigation is required by Ku-ring-gai Council for assessment of a proposed residential planning proposal for the site and redevelopment of the golf club.

Objectives

The main objectives of the assessment were to:

- Evaluate the potential for site contamination on the basis of historical land uses, anecdotal and documentary evidence of possible pollutant sources (Preliminary Site Investigation - PSI);
- To investigate the degree of any potential contamination by means of limited intrusive sampling and laboratory analysis, for relevant contaminants of concern (Detailed Site Investigation – DSI) ; and
- Where site contamination is confirmed, make recommendations for the appropriate management of any contaminated soils.

Findings

- The site, which fronts Cowan Road to the east, consists of four allotments (Lot 1 DP511821, Lot B DP368565, Lot 1, 2, and 3 DP531533), covering a total area of 9,773 m². The site is occupied by Pymble Golf Club clubhouse and car parking facilities, a bowling green and two residential dwellings;
- Historical records indicated that the proposed development area has been used as part of a golf club since early 1920s. The surrounding areas were predominantly rural-residential with orchard activity up until at least late 1930s. In the early 1940s, the site was further developed as a golf clubhouse and for residential purpose. Site use has remained the same since the 1940s;
- The site was free of statutory notices issued by the NSW EPA and was not recorded on the List of NSW Contaminated Sites Notified to EPA or the POEO register;
- SafeWork NSW records revealed the presence of two underground storage tanks and three roofed store areas for herbicides, fungicides and pesticides on the larger golf course site. However, based on the attached drawing in the records, the locations of the dangerous goods depots were outside the study area, and approximate 400 m north-west and hydraulically down-gradient of the proposed development area;
- The sub-surface layers comprised primarily of gravelly clay and silty sand fill materials, overlying residual clays (low to high plasticity) and weathered shale bedrock;
- Soil sampling and analysis were conducted at twenty-one borehole locations (BH101M to BH121) down to a maximum depth of 8.0 mBGL;
  - Soil samples collected and laboratory analysed from the twenty-one borehole locations were below the adopted human-health investigation and ecological criteria.

- Three groundwater monitoring wells (BH101M, BH115M and BH118M) were installed during the investigation. Groundwater was not encountered during the investigation as monitoring wells were dry. Based on information gathered during the PSI (EI, 2018) and laboratory analytical results obtained during this investigation, groundwater is unlikely to represent a significant risk of harm to human health or the environment;

- Based on the investigation findings, the CSM appropriately identified contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Most previously known data gaps have largely been addressed, however, the following data gaps that remain will require closure by further investigation:

  - The quality of soils beneath building structure areas of the site not accessible during this investigation; and

  - Potential presence of hazardous materials present within existing structures on the site.

Conclusions and Recommendations

Based on the findings from of this DSI, conducted in accordance with the investigation scope agreed with the Client, and with consideration of the Statement of Limitations (**Section 12**), contamination exceeding human-health investigation criteria was not identified. While some data gaps remain that require closure by further intrusive investigation, the available quantitative soil data does not indicate the presence of contamination that would preclude the site from being rezoned for residential purposes.

Based on the findings of this investigation, EI consider the site is suitable for the proposed redevelopment, subject to the implementation of the following recommendations:

- Prior to site demolition, carry out a Hazardous Materials Survey on existing site structures to identify potentially hazardous building products that may be released to the environment during demolition;

- Following the completion of demolition works and the removal of demolition debris, a clearance inspection be undertaken by a qualified occupational hygienist and subsequent clearance certificate issued;

- Following demolition, intrusive soil investigation is to be completed within the building footprints of the previously in accessible structures to characterise soil quality;

- Any material being removed from site (including virgin excavated natural materials (VENM)) as part of the proposed development works is to be classified for off-site disposal in accordance the EPA (2014) *Waste Classification Guidelines*;

- Any material being imported to the site should be assessed for potential contamination in accordance with NSW EPA guidelines as being suitable for the intended use or be classified as VENM; and

- Should unexpected finds (contamination) be encountered during redevelopment works a qualified environmental consultant be engaged to inspect the finds and offer appropriate guidance.

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1. INTRODUCTION

1.1 BACKGROUND AND PURPOSE

Pymble Golf Club engaged EI Australia (EI) to conduct a Detailed Site Investigation (DSI) for the property located at Pymble Golf Club 4, 12-14 Cowan Road, St Ives NSW. The area of investigation ('the site') is located in the east portion of the site, and covers a total area of approximately 9,773 m², as depicted in **Figure 2**.

The site, located approximately 16 km north-west of the Sydney central business district (CBD) (**Figure 1**), comprises five allotments (Lot 1 DP511821, Lot B DP368565, Lots 1, 2, and 3 DP531533), and is situated within the Local Government Area of Ku-ring-gai Council,. The site is currently occupied by Pymble Golf Club clubhouse and associated car parking facilities, a bowling green, and two residential dwellings.

EI understand that this investigation is required by Ku-ring-gai Council for assessment of a proposed residential planning proposal for the site.

1.2 PROPOSED DEVELOPMENT

Based on proposed development plans (**Appendix A**), EI understand that the redevelopment involves a planning proposal to Ku-ring-gai Council that seeks to amend Ku-ring-gai Local Environmental Plan (Local Centres) 2012 and Ku-ring-gai Local Environmental Plan 2015 to allow low rise residential flat development that would accommodate 77 dwellings. A redevelopment of the golf clubhouse is also proposed.

For assessment purposes, deep soils are proposed to be retained onsite in the vicinity of four proposed residential building (Block A to D), and within a terrace area in the vicinity of the new proposed club house. These locations are shown in **Appendix A** and **Figure 2**.

1.3 REGULATORY FRAMEWORK

The following regulatory framework and guidelines were considered during the preparation of this report:

- ANZAST (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality;*
- Ku-ring-gai Council (2015) Local Environmental Plan;
- Ku-ring-gai Council (2015) Development Control Plan;
- EPA (1995) *Sampling Design Guidelines*;
- EPA (2017) *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme*;
- NEMP (2018) *PFAS National Environmental Management Plan*;
- NEPM (2013) *Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater*;
- NEPM (2013) *Schedule B(2) Guideline on Site Characterisation*;
- *Contaminated Land Management Act 1997*;

- State Environment Protection Policy 55 (SEPP 55) – *Remediation of Land*; and
- OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*.

1.4 PROJECT OBJECTIVES

The proponent approached EI, to undertake a detailed site investigation for the purpose of obtaining baseline data on the status of the site prior to redevelopment. The primary objectives of this DSI were therefore to:

- Evaluate the potential for site contamination on the basis of historical land uses, anecdotal and documentary evidence of possible pollutant sources (Preliminary Site Investigation - PSI);
- To investigate the degree of any potential contamination by means of limited intrusive sampling and laboratory analysis, for relevant contaminants of concern (Detailed Site Investigation – DSI) ; and
- Where site contamination is confirmed, make recommendations for the appropriate management of any contaminated soils.

1.5 SCOPE OF WORKS

In accordance with EI fee proposal P16614.1 (dated 19 June 2018), to achieve the above objectives, the scope of works was as follows:

1.5.1 Desktop Study

- A review of all relevant and available mapping for the project area; and
- A review of previous environmental reports

1.5.2 Field Work & Laboratory Analysis

- A site walkover inspection;
- Drilling of boreholes at twenty-one (21) locations across accessible areas of the site. This number of locations meets the minimum sampling protocol recommended under EPA (1995);
- Construction of three (3) groundwater monitoring wells to a maximum depth of 9 mBGL. The groundwater monitoring bores will be constructed to standard environmental protocols to investigate the potential for groundwater contamination;
- Multiple level soil sampling within fill and natural soils and one round of groundwater sampling from the three constructed groundwater monitoring wells; and
- Laboratory analysis of selected soil and groundwater samples for relevant analytical parameters as determined from the site history survey and field observations during the investigation programme.

1.5.3 Data Analysis and Reporting

Preparation of a DSI report documenting desk top study findings, conceptual site model, data quality objectives, investigation methodologies, and results. The report would also provide a record of observations made during the intrusive investigation and a discussion of laboratory analytical results in regards to potential risks to human health, the environment and the aesthetic uses of the land.

2. SITE DESCRIPTION

2.1 PROPERTY IDENTIFICATION, LOCATION AND PHYSICAL SETTING

The site identification details and associated information are presented in **Table 2-1**, while the site locality is shown in **Figure 1**.

Table 2-1 Site Identification, Location and Zoning

Attribute	Description
Street Address	Pymble Golf Club 4, 12-14 Cowan Road, St Ives NSW
Location Description	The site is located approx. 16 km north-west of the Sydney CBD, and is bound by: • **North**: Residential properties and existing golf course; • **East**: Cowan Road, followed by low-density residential properties and a shopping centre; • **South**: Residential properties and existing golf course; and • **West**: Existing golf course, followed by Cowan Creek then low density residential properties. The site is occupied by Pymble Golf Club clubhouse and car parking facilities, bowling green and two residential dwellings. •
Site Coordinates	North eastern corner of site (GDA94-MGA56): • Easting: 329212.688 • Northing: 6266249.746 (Source: http://maps.six.nsw.gov.au)
Site Area	Approx. 10,000 m²
Lot and Deposited Plan (DP)	Lot 1 DP511821, Lot B DP368565, Lot 1, 2, and 3 DP531533
State Survey Marks	One State Survey (SS) mark and Three Permanent Mark (PM) are situated in close proximity (<50 m) to the site: • SS126520 (Approx. 6 m east of site on the Cowan Road) • PM2486 (Approx. 3 m east of site, on the Cowan Road) • PM10921 (Approx. 30 m south-east of site, on the corner of Cowan Road and Mona Vale Road) • PM2454D (Approx. 36 m south-east of site, on the corner of Cowan Road and Mona Vale Road) (Source: http://maps.six.nsw.gov.au/).
Local Government Authority	Ku-ring-gai Council
Parish	Gordon
County	Cumberland
Current Zoning	RE2 Private Recreation and R3 Medium Density Residential • Ku-ring-gai Local Environmental Plan 2015 • Ku-ring-gai Local Environmental Plan 2012 (Town Centres)

Current Land Uses	The site is occupied by Pymble Golf Club clubhouse and car parking facilities, bowling green and two residential dwellings.

2.2 SURROUNDING LAND USE

The site is situated within an area of mixed land uses and current uses. Current uses of surrounding land are described in **Table 2-2**.

Table 2-2 Surrounding Land Uses

Direction	Land Use Description	Sensitive Receptors (& distance from site)
North	Residential properties and existing golf course	Residential Dwellings (<60 m north) St Ives Village Green (approx. 200 m north)
South	Residential properties and existing golf course	Residential Dwellings (100 m south) Dalrymple Hay Nature Reserve (approx. 500 m south)
East	Cowan Road, followed by low-density residential properties and a shopping centre	Residential Dwellings (<60 m east)
West	Existing golf course, followed by Cowan Creek then low density residential properties	Cowan Creek (approx.750 m west)

Overall, sensitive land uses, such as schools or childcare centres, were not identified within the vicinity (500 m) of the site.

2.3 REGIONAL SETTING

Regional topography, geology, soil landscape and hydrogeological information are summarised in **Table 2-3**.

Table 2-3 Regional Setting Information

Attribute	Description
Topography	Based on observations noted during the site walkover, the site generally slopes towards the west and north west.
Site Drainage	Site drainage is likely to be consistent with the general slope of the site. Stormwater is likely to be collected by pit and pipe drainage, draining to the municipal stormwater system.
Regional Geology	The site is likely to be underlain by the Ashfield Shale, which is characterised by black to dark grey shale and laminite, (Ref. 1:100 000 Geological Series Sheet 9130 – Sydney, NSW DMR).

Attribute	Description
Soil Landscapes	The Soil Conservation Service of NSW Soil Landscapes of the Sydney 1:100,000 Sheet (Chapman and Murphy, 2002) indicates that The site overlies the Glenorie (gn) landscape. The landscape comprises of undulating to rolling rises on Wianamatta Group shales. Soils are identified as shallow to moderately deep (<100 cm) red podzolic soils on crests, moderately deep (70-100 cm) red and brown podzolic soils on upper slopes, deep >200 cm yellow podzolic soils on lower slopes and humic gleys. Yellow podzolic soils and gleyed podzolic soils on drainage lines.
Acid Sulfate Soils	With reference to the Ku-ring-gai Council Acid Sulfate Soils (ASS) map (ASS-013) the Lot 1 DP 511821 is mapped as *Class 5* Acid Sulfate Soils. Class 5 areas are likely to locate ASS during works within 500 metres of adjacent Class 1, 2, 3, or 4 land which are likely to lower the water table below 1 metre AHD on adjacent Class 1,2, 3 or 4 land. With reference to Hornsby / Mona Vale Acid Sulfate Soil Risk Map (1:25,000 scale; Murphy, 1997), the subject land lies within the map class description of *No Known Occurrence*. In such cases, acid sulfate soils (ASS) are not known or expected to occur and "land management activities are not likely to be affected by ASS materials".
Typical Soil Profile	Thin surficial sandy fill material overlying residual clay and shale bedrock. **Fill –** Silty sand; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour. Gravelly clay; low plasticity, orange, with sub-angular to angular gravels, no odour. **Residual –** Clay; low to medium plasticity, red, no odour. Clay; medium to high plasticity, grey mottled red, no odour. **Bedrock** – Shale; weathered rock, red, no odour. Shale; slightly weathered, grey, no odour.
Depth to Groundwater	Groundwater was not encountered during the current investigation.
Nearest Surface Water Feature	Cowan Creek, approximately 600 m west of the site.
Groundwater Flow Direction	West, towards Cowan Creek.

2.4 GROUNDWATER BORE RECORDS AND LOCAL GROUNDWATER USE

An online search of registered groundwater bores was conducted by EI on 6 September 2018 through the WaterNSW (Ref. https://realtimedata.waternsw.com.au/water.stm). There were 28 registered bores within a 500 m radius of the site. A summary of 5 selected bores is presented with details in **Table 2-4**. A groundwater bore location plan and detailed information regarding the listed bores is attached in **Appendix B**.

Table 2-4 Summary of Registered Groundwater Bores

Bore No.	Date Drilled	Distance and Direction	Drilled Depth (m)	SWL(m BGL)* / Salinity	Bore Purpose
GW112191	31.01.2003	125 m south-east	-	NA / NA	Monitoring Bore
GW112190	31.01.2003	125 m south-east	-	NA / NA	Monitoring Bore
GW112193	30.01.2003	125 m south-east	-	NA / NA	Monitoring Bore
GW110701	31.07.2009	125 m south	7.0	5.3 / NA	Monitoring Bore

Bore No.	Date Drilled	Distance and Direction	Drilled Depth (m)	SWL(m BGL)* / Salinity	Bore Purpose
GW110700	31.07.2009	125 m south	7.0	5.3 / NA	Monitoring Bore

2.5 SITE WALKOVER INSPECTION OBSERVATIONS

Site observations were recorded during a site walkover inspection of the site on 7-8 January 2019. A summary of site observations is detailed below and site photographs taken during the inspection are present in **Appendix C**. Site observations are summarised in **Table 2-5**.

Table 2-5 Buildings and Infrastructure Summary

Allotment	Buildings	USTs/ASTs	Observations
Lot 1 DP511821	Clubhouse	Not evident	• The central portion of the site is occupied by a clubhouse. (**Appendix C**, Photo 3); and • The remaining land in front of the clubhouse is covered with asphalt for car parking purposes. The concrete is old, but in good conditions with minor cracking and deformation evident (**Appendix C**, Photo 1).
Lot B DP 368565	Nil	Not evident	• The land is covered with asphalt for car parking purposes. The concrete is old, but in good conditions with minor cracking and deformation evident (**Appendix C**, Photo 1).
Lot 1 DP 531533	A residential dwelling	Not evident	• The site is currently occupied by a residential dwelling (**Appendix C**, Photo 6).
Lot 2 DP 531533	Nil	Not evident	• The site is currently a gravel vacant area (**Appendix C**, Photo 7);
Lot 3 DP 531533	A residential dwelling	Not evident	• The site is currently occupied by a residential dwelling. (**Appendix C**, Photo 2).

3. PREVIOUS INVESTIGATIONS

3.1 AVAILABLE DOCUMENTS

EI understands that this report follows on from the previous investigations completed for the site:

- EI Australia (2018) *Preliminary Site Investigation, Pymble Golf Club 4, 12-14 Cowan Road, St Ives NSW* (ref. E23975.E01_Rev1).

A summary of works and key findings of the previous assessment reports are outlined in **Table 3-1**.

Table 3-1 Summary of Previous Investigation Findings

Assessment Details	Project Tasks and Findings
Key Findings	Land titles records and historic aerial photography indicated that the site was predominantly rural residential up until at least the late 1930's. As early as the 1940s, the site was redeveloped as a golf clubhouse and residential purposes, with surrounding land use predominantly residential and commercial. SafeWork NSW records reported the presence of two underground storage tanks and three roofed store areas for herbicides, fungicides at the Pymble Golf Club. However, the location of these depots are outside the study area and approximate 400 m northwest and hydraulically down-gradient of the site; While Ku-ring-gai Council records were unavailable for review at the time of writing, EPA records revealed three service station properties with 150 m that had been reported to the EPA as potentially contaminated, or were the subject of a remediation order. All properties, however, are noted to occur hydraulically down gradient of the site, and are unlikely to be potential offsite contamination sources. The site walkover inspection identified a number of potential sources of contamination typically associated with residential properties and golf courses (e.g. weathered structures, herbicide/pesticide use, placement of fill, use of hazardous building materials in structures, etc.). The conceptual site model (CSM) and qualitative risk assessment produced from the information gathered by the PSI identified potential contaminating sources and relevant exposure pathways to end users of the site that would be present under the proposed redevelopment layout.
Conclusions and Recommendations	It was conclude that there was potential for contamination to be present on the site that could pose risks to end users following redevelopment. As such, a detailed site investigation (DSI) involving intrusive investigations was recommended to characterise the environmental conditions of the site. The PSI also recommened that a hazardous materials survey be conducted on existing site structures prior to demolition.

4. CONCEPTUAL SITE MODEL

In accordance with NEPM (2013) *Schedule B2 – Guideline on Site Characterisation* and to aid in the assessment of data collection for the site, EI developed a conceptual site model (CSM) assessing plausible pollutant linkages between potential contamination sources, migration pathways and receptors. The CSM provides a framework for the review of the reliability and useability of the data collected and to identify data gaps in the existing site characterisation.

4.1 SUBSURFACE CONDITIONS

The overall site geological conditions encountered in the DSI are summarised in **Table 8-1** the subsurface was generally shallow gravelly clay fill overlying residual clay.

4.2 POTENTIAL SOURCES, EXPOSURE PATHWAYS AND RECEPTORS

Potential contamination sources, exposure pathways and human and environmental receptors that were considered relevant for this assessment are summarised along with a qualitative assessment of the potential risks posed by complete exposure pathways in **Table 4-5**.

4.3 CONTAMINATION SOURCES

Base on the site history and the site inspection, the primary contaminant sources considered to be present at the site are outlined in **Table 4-1**.

Table 4-1 Contaminant Sources

Contaminant Source	Comment	Potential Impacts
Surface filling	Y	A wide range of potential inorganic and organic chemicals
Demolition of former buildings	Y	Potential paint and fibrous cement sheeting fragments potentially containing asbestos
Degradation of building surfaces (including fences)	Y	Priority metals particularly Cu, Pb & Zn, paint fragments and asbestos fines, including friable asbestos from fire damaged building(s).
Potential use of pesticides on or underneath building footprints and sealed surfaces	Y	Potential soil contamination of OCP's, OPP's, and PCBs
Current commercial site activities (golf club), potential use of pesticides across the site.	Y	Potential soil contamination of OCP's, OPP's, and PCBs
Contamination from off-site sources	Y	Potential impact of VOCs, PAHs and heavy metals from adjacent petrol stations.
Potential contamination in areas not accessible during investigations (underneath building footprints)	Y	Potential impact of heavy metals, OCP's, OPP's, BTEX, PCB's and PAH's from future demolition due to structure metals.

Note 1 Y – Yes, N- No, N/A – Not applicable

4.4 CONTAMINANTS OF POTENTIAL CONCERN

Based on the findings of the site contamination appraisal, the contaminants of potential concern (COPC) at the site and the potential media impacts are outlined in **Table 4-2**. For definitions and abbreviations see glossary at end of report.

Table 4-2 Contaminants of Potential Concern

Contaminants of Potential Concern	Soil Impacts[1]	Air Quality Impacts[1]	Groundwater Impacts[1]
Priority metals As, Cd, Cr, Cu, Hg, Ni, Pb, & Zn also commonly known as heavy metals (HMs)	H	L	L
Other metals Be, Co, Cr^{VI}, Mn, Se	L	N/A	L
Total recoverable hydrocarbons (TRH)	L	L	L
Monocyclic aromatic hydrocarbon compounds benzene, toluene, ethyl benzene and xylenes (BTEX)	M	L	L
Polycyclic aromatic hydrocarbons (PAH) including B(a)P TEQ	M	L	L
Volatile organic compounds (VOCs) including Chlorinated volatile organic compounds (cVOCs)	L	L	L
Organochlorine and Organophosphate pesticides (OCP/ OPP)	M	N/A	L
Phenols	L	N/A	L
Polychlorinated biphenyls (PCB)	M	N/A	L
Asbestos	M	L	N/A
LNAPL or DNAPL	N/A	N/A	L
Others (See Section 4.5)	L	L	L

Note:
L – low risk.
M – medium/moderate risk.
H – high risk.
N/A – not applicable (or "-")

4.5 OTHER CHEMICALS OF CONCERN

4.5.1 Per or poly-fluoroalkyl substances (PFAS)

The NSW EPA (2017) auditor guidelines and the PFAS National Environmental Management Plan (NEMP) (2018) require that PFAS is considered in assessing contamination. EI use the following decision tree (**Table 4-3**) based on EnRisk (2016) for prioritising the potential for PFAS to be present on site and whether PFAS sampling of soil and water is required.

Table 4-3 PFAS Decision Tree

Preliminary Screening	Decision
Did fire training occur on-site?	No
Did fire training occur, or is an airport or fire station up-gradient of or adjacent to the site? [1]	No
Have "fuel" fires ever occurred on-site? (e.g. ignition of fuel (solvent, petrol, diesel, kerosene) tanks?)	No
Have PFAS been used in manufacturing or stored on-site ?[2]	No
If Yes to any questions, has site analytical suite been optimised to include preliminary sampling and testing for PFAS in soil (ASLP Testing) and water?	-

Note 1 Runoff from fire training areas may impact surface water, sediment and groundwater.
Note 2 PFAS is used wide range of industrial processes and consumer products, including in the manufacture of non-stick cookware, specialised garments and textiles, Scotchguard™ and similar products (used to protect fabric, furniture, leather and carpets from oils and stains), metal plating and in some types of fire-fighting foam (https://www.nicnas.gov.au/chemical-information/factsheets/chemical-name/perfluorinated-chemicals-pfas)

4.5.2 Emerging Chemicals

The NSW EPA uses Chemical control orders (CCOs) as a primary legislative tool under the EHC Act (1985) to selectively and specifically control particular chemicals of concern, and limit their potential impact on the environment. CCOs provide the EPA a rapid and flexible mechanism for responding to emerging chemical issues. As with PFAS, EI has considered chemicals controlled by CCOs and other potential emerging chemicals in this assessment as outline in **Table 4-4**.

Table 4-4 Emerging or controlled chemicals

Chemicals of Concern (CCO or emerging)	Decision
Were aluminium smelter wastes used or stored on site (CCO,1986)?	No
Do dioxin contaminated wastes (CCO,1986) have the potential to impact the site? [1]	No
Were organotin products (CCO,1989) used or stored on site ?[2]	No
Were polychlorinated biphenyls (PCBs) used or PCB wastes (CCO, 1997) stored on-site?[3]	Yes *If PCB containing Organochlorine pesticides were used onsite*
Were scheduled chemical or wastes (CCO, 2004) used or stored[4]	Yes *If Organochlorine pesticides were used onsite*
Are other emerging chemicals suspected?[5]	No
If Yes to any questions, has site sampling suite been optimised to include specific sampling for other chemicals of concern in soil, air and water	**Yes**

Note 1 From burning of certain chemicals, smelting or chemical manufacturing or fire on or near the site.
Note 2 From anti-fouling paints used or removed at boat & ship yards and marinas.
Note 3 From older transformer oils, electrical capacitors, and in some pesticides.
Note 4 Twenty-four mostly organochlorine pesticides and industrial by-products
Note 5 Other chemicals considered as emerging e.g. 1,4 dioxane (associated with some cVOCs),

Table 4-5 Conceptual Site Model

Impacted Media	Contaminants of Potential Concern	Transport mechanism	Exposure pathway	Potential receptor
Soil	HM, TRH, PAH, BTEX, OCP, OPP, PCB, and asbestos	Disturbance of surficial and subsurface soils during site redevelopment, future site maintenance and future use of the site post redevelopment	Ingestion; Dermal contact; Inhalation of asbestos fibres and dust particulates	Current commercial occupants at the site Construction and maintenance workers End users of the site post redevelopment
		Atmospheric dispersion from soil to indoor and outdoor air spaces	Inhalation of asbestos fibres and dust particulates	
	HM, TRH, PAH, BTEX, OCP	Plant uptake of contamination present in root zone	Plant uptake	Future ecological receptors (e.g. site vegetation post redevelopment)
Groundwater	HM, TRHs, BTEX, PAHs, volatile organic compounds (VOCs), and Phenols (Total).	Volatilisation of contamination from groundwater to indoor or outdoor air spaces (onsite and offsite)	Inhalation of vapours	Aquatic ecosystems Ecological Receptors (Cowan Creek) Recreational water users
		Migration of dissolved phase impacts in groundwater	Contaminants arriving at receiving surface water bodies could lead to ingestion and dermal contact	
	F1 and F2 TRH, BTEXN, Phenols (Total) and VOCs	Potential seepage into deep basement intercepting water table (on and offsite)	Dermal contact Ingestion	
Building fabrics containing hazardous materials	Lead, PCB and asbestos	Release of hazardous materials during uncontrolled demolition of building fabrics	Ingestion; Dermal contact; Inhalation of airborne contaminants	Construction and maintenance workers

4.6 DATA GAPS

Based on information from the site walkover inspection and site history review, EI considered a programme of intrusive investigation was warranted to conduct targeted sampling at locations of known, potential sources of contamination (as listed in **Section 4.3**), with systematic sampling coverage in site areas where operational site history was not documented.

5. SAMPLING, ANALYTICAL AND QUALITY PLAN (SAQP)

The SAQP plays a crucial role in ensuring that the data collected as part of this, and ongoing environmental works carried out at the site are representative, and provide a robust basis for site assessment decisions. This SAQP includes the following:

- Data quality objectives, including a summary of the objectives of the DSI;
- Investigation methodology including media to be sampled, details of analytes and parameters to be monitored and a description of intended sampling points;
- Sampling methods and procedures;
- Field screening methods;
- Analysis Methods;
- Sample handling, preservation and storage; and
- Analytical QA/QC.

5.1 DATA QUALITY OBJECTIVES (DQO)

In accordance with the US EPA (2006) *Data Quality Assessment* and the EPA (2017) *Contaminated Land Management*: *Guidelines for the NSW Site Auditor Scheme*, the process of developing Data Quality Objectives (DQO) was used by the EI assessment team to determine the appropriate level of data quality needed for the specific data requirements of the project. The DQO process that was applied for this assessment is documented in **Table 5-1**.

Table 5-1 Summary of Project Data Quality Objectives

DQO Steps	Details	Comments (changes during investigation)
1. State the Problem Summarise the contamination problem that will require new environmental data, and identify the resources available to resolve the problem; develop a conceptual site model	Deep soils are proposed to be retained onsite in the vicinity of two proposed residential building (Block A and Block B) and terrace area to the north and east of the new proposed club house. The site is subject to re-zoning under Ku-ring-gai Council. Based on the findings of the PSI (EI, 2018), a number of potential contamination sources were identified at the site, and a CSM (**Section 4**) has been developed to identified source-exposure pathway-receptor linkages associated with the proposed development. A program of intrusive investigation is therefore required to provide additional data for characterisation of the environmental conditions at the site. The purpose of the investigation is to obtain baseline data on site soil/ groundwater conditions prior to the rezoning and future redevelopment of the site (**Section 1.2**).	-
2. Identify the Goal of the Study (Identify the decisions) Identify the decisions that need to be made on the contamination problem and the new environmental data required to make them	The decisions needed to be made in this DSI are: • Has the nature, extent and source of any soil, vapour and/or groundwater impacts onsite been defined? • What impact do the site specific, geologic and hydrogeological conditions have on the fate and transport of any impacts that may be identified? • Does the level of impact coupled with the fate and transport of identified contaminants represent an unacceptable risk to identified human and/or environmental receptors on or offsite? • Does the collected data provide sufficient information to allow the selection and design of an appropriate remedial strategy, if necessary?	-

DQO Steps	Details	Comments (changes during investigation)
3. Identify Information Inputs (Identify inputs to decision) Identify the information needed to support any decision and specify which inputs require new environmental measurements	The main inputs to the decision making process include: • Proposed development plans and land use; • Regional and site settings including site geology, topography and surrounding land uses; • Information provided in the previously completed PSI (EI, 2018); • Aerial photographs, historical land title records, council records; • Areas of concern identified during the site inspection prior to intrusive investigations; • National and NSW EPA guidelines under the NSW *Contaminated Land Management Act 1997*; • Intrusive investigation sampling to characterise environmental conditions at the site and to evaluate the potential risks to sensitive receptors; and • Laboratory analytical results of soil and groundwater samples collected.	-
4. Define the Boundaries of the Study Specify the spatial and temporal aspects of the environmental media that the data must represent to support decision	Lateral – cadastral boundaries of the site; Vertical – for soil investigation, from the existing ground level to at least 0.5 m into the natural soil strata, and underlying water-bearing zones; and Temporal – Results are valid on the day of sample collection and remain valid as long as no changes occur on site or contamination (if present) does not migrate on site or onto the site from off-site sources.	Lateral – the extent of the study onsite was limited to accessible areas of the site due to existing building structures, infrastructure, and the location of services. During drilling, groundwater was not encountered at the proposed depth of 8 m BGL.
5. Develop the Analytic Approach (Develop a decision rule) To define the parameter of interest, specify the action level, and integrate previous DQO outputs into a single statement that describes a logical basis for choosing from alternative actions	The decision rules for the investigation were: • If the concentrations of contaminants in the soil data exceed the land use criteria; then assess the need to further investigate the extent of impacts and the need for remedial works onsite. • Decision criteria for QA/QC measures are defined by the Data Quality Indicators (DQI) in **Table 5-2**.	-

DQO Steps	Details	Comments (changes during investigation)
6. Specify Performance or Acceptance Criteria (Specify limits on decision errors) Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data	Specific limits for this project are to be in accordance with the National and NSW EPA guidance, and appropriate indicators of data quality and standard procedures for field sampling and handling. This should include the following points to quantify tolerable limits: • The null hypothesis for the investigation is that the: – 95% Upper Confidence Limits (UCL) of the mean for contaminants of concern exceed relevant residential, recreational, or commercial / industrial land use criteria across the site. • Sampling on a 22 m grid will allow detection of a circular hotspot with a nominal diameter of 25.7 m with 95% certainty; • The acceptance of the site as validated will be based on the probability that – The 95% UCL of the mean of the data will satisfy the given site criteria. Therefore a limit on the decision error will be 5% that a conclusive statement may be incorrect; – The standard deviation of the results is less than 50% of the relevant remediation acceptance criterion; and – No single results exceeds the remediation acceptance criteria by 250% or more; and • Soil concentrations for COPCs that are below investigation criteria made or approved by the NSW EPA will be treated as acceptable and indicative of suitability for the proposed land use(s); and • If contaminant concentrations in groundwater exceed the adopted criteria, further investigation will be considered prudent. If no contamination is detected in groundwater, further action will not be warranted.	• Due to the existing site structures, a systematic sampling pattern was not achieved in this DSI. As a result, the reliability of detecting a circular hotspot of diameter 25.7 m could not be achieved using the adopted targeted sampling pattern. • The DSI primarily adopted a targeted sampling pattern, focusing on areas accessible for intrusive investigation. As such, individual soil data points were largely assessed against adopted criteria.
7. Develop the Detailed Plan for Obtaining Data (Optimise the design for obtaining data) Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs	• The site area (10,000 m^2) required twenty-one sampling points according to EPA (1995). • Soil sampling locations will be set using a systematic sampling pattern across the site. • All samples would be selected for testing based on field observations (including visual and olfactory evidence, as well as soil vapour screening in headspace samples. • Three groundwater monitoring wells were proposed to characterise groundwater quality within the site. • Written instructions will be issued to guide field personnel in the required fieldwork activities.	Groundwater monitoring wells were not sampled as monitoring wells were dry

5.2 DATA QUALITY INDICATORS

To ensure that the investigation data collected was of an acceptable quality, the investigation data set was assessed against the data quality indicators (DQI) outlined in **Table 5-2**, which related to both field and laboratory-based procedures. The assessment of data quality is discussed in **Section 7**.

Table 5-2 Data Quality Indicators

Data Quality Objective	Data Quality Indicator	Acceptable Range
Precision – A quantitative measure of the variability (or reproducibility) of data	**Field:** Blind duplicate and triplicate samples	< 30 % relative percentage difference (RPD [%]) in concentrations between the primary and the duplicate sample pair. RPDs that exceed this range may be considered acceptable where: • Results are less than 10 times the limits of reporting (LOR); • Results are less than 20 times the LOR and the RPD is less than 50%; and • Heterogeneous materials or volatile compounds are encountered.
	Laboratory: Laboratory duplicates, control spike and matrix spike	Prescribed by the laboratories
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	**Field:** Rinsate blank Trip blank (laboratory prepared)	 < laboratory limit of reporting (LOR) < laboratory limit of reporting (LOR)
	Laboratory: Laboratory control spike, matrix spike, reagent blanks / method blanks and surrogate spikes	Prescribed by the laboratories
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	**Field:** Trip blank (laboratory prepared) Trip spike (laboratory prepared)	 < laboratory limit of reporting (LOR) Spike recoveries between 70% - 130%
	Laboratory: Method blank Conformance with specified holding times	Prescribed by the laboratories / NEPM 2013
Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Same sampling and analytical method Same types of sample Adherence to standard operation procedure	-
Completeness – A measure of the amount of useable data from a data collection activity	Completion (%)	Compliance with the SAQP

6. ASSESSMENT METHODOLOGY

6.1 SAMPLING RATIONALE

With reference to the CSM described in **Section 4**, soil works were planned in accordance with the following rationale:

- Sampling fill and natural soils from twenty-one borehole locations located systematically across the site using an approximate grid-based sampling pattern to characterise in-situ soils;
- Construction of three groundwater monitoring wells to a maximum depth of 7 mBGL (or refusal) for groundwater characterisation; and
- Laboratory analysis of representative soil samples and groundwater samples for the identified contaminants of potential concern.

6.2 INVESTIGATION CONSTRAINTS

The number of test bores drilled installed during the investigation phase achieved the planned investigation scope described in **Section 1.5**, however there were a number of constraints encountered, including:

- Due to the presence of existing structures on the site, soils beneath these structures could not be characterised. In light of this constraint, soils within the investigation area could not be systematically evaluated to determine a hotspot size of
- Due to borehole refusal in shale at the three monitoring well locations, monitoring wells were installed at shallower depths than anticipated without seepage being identified; and
- Due to the irrigation pipe was encountered at BH114 at shallow depth, deeper soil profile was not reached at this subject location.

6.3 ASSESSMENT CRITERIA

The assessment criteria proposed for this project are outlined in **Table 6-1**. These were selected from available published guidelines that are endorsed by national or state regulatory authorities, with due consideration of the exposure scenario that is expected for various parts of the site, the likely exposure pathways and the identified potential receptors.

Table 6-1 Adopted Investigation Levels for Soil and Groundwater

Environmental Media	Adopted Guidelines	Rationale
Soil	NEPM, 2013 Soil HILs, EILs, HSLs, ESLs & Management Limits for TPHs	**Soil Health-based Investigation Levels (HILs)** As a a conservative approach, all soil samples within residential and clubhouse footprints will be assessed against the NEPM 2013 HIL-B thresholds for residential sites with minimal access to soils. All soil samples within the rest area of the site will be assessed against the NEPM 2013 HIL-C thresholds for public open space purposes. **Ecological Investigation Levels (EILs)** Soil samples will also be assessed against the NEPM 2013 EILs on residential site for areas of the site designated for landscaping. Soil samples will be compared against the NEPM 2013 EILs for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene which have been derived for protection of terrestrial ecosystems. **Table 8-4** provides a summary of adopted Added Contaminant Levels (ACL) and Ambient Background Concentrations for the derivation of copper, chromium (III), nickel, lead, and zinc EILs. Generic EILs were adopted for ecological assessment in relation to arsenic, DDT and naphthalene. **Soil Health-based Screening Levels (HSLs)** <u>Hydrocarbon HSLs:</u> The NEPM (2013) HSL-A&B thresholds for low to high density residential land use were applied to proposed residential areas, to assess for potential human health impacts from residual vapours resulting from petroleum, BTEX & naphthalene. The NEPM (2013) HSL-D thresholds commercial land use were applied to the proposed golf club area, assess for potential human health impacts from residual vapours resulting from petroleum, BTEX & naphthalene. The NEPM (2013) HSL-C thresholds recreational land use were applied to the proposed open space areas, assess for potential human health impacts from residual vapours resulting from petroleum, BTEX & naphthalene. **Ecological Screening Levels (ESLs)** Soil samples will be assessed against the NEPM 2013 ESLs for selected petroleum hydrocarbons & TRH fractions for protection of terrestrial ecosystems on residential sites. **Management Limits for Petroleum Hydrocarbons** Should the ESLs and HSLs be exceeded for petroleum hydrocarbons, soil samples will also be assessed against the NEPM 2013 *Management Limits* for the TRH fractions F1 – F4 to assess propensity for phase-separated hydrocarbons (PSH), fire and explosive hazards & adverse effects on buried infrastructure.
Groundwater	ANZG, 2018 GILs for Fresh Water	**Groundwater Investigation Levels (GILs) for Fresh Water** ANZG, 2018 provides GILs for typical, slightly-moderately disturbed aquatic ecosystems, which are based on the ANZAST 2018 Trigger Values (TVs) for the 95% level of protection of aquatic ecosystems; however, the 99% TVs were applied for the bio-accumulative metals *cadmium* and *mercury*. The marine criteria were considered relevant as the closest, potential surface water receptor was Cowan Creek, located approximately 600 m west of the site.
	NEPM, 2013 Groundwater HSLs,	**Groundwater Health-based Screening Levels (HSLs)** The NEPM 2013 groundwater HSLs for vapour intrusion were used to assess for potential human health impacts from residual vapours resulting from petroleum, BTEX and naphthalene impacts. The *HSL-A&B* thresholds for low to high-density residential sites were applied for groundwater.

Environmental Media	Adopted Guidelines	Rationale
	NEPM, 2013 GILs for Drinking purposes	**Drinking Water GILs** The NEPM (2013) GILs for drinking water quality were applied for the assessment of direct contact with groundwater. These were based on the Australian Drinking Water Guidelines (Ref. NHMRC, 2011).

For the purposes of this investigation, the adopted soil assessment criteria are referred to as the Soil Investigation Levels (SILs). SILs are presented alongside the analytical results in the corresponding summary tables, which are discussed in **Section 8**.

6.4 SOIL INVESTIGATION

The soil investigation works conducted at the site are described in **Table 6-2**. Test bore locations are illustrated in **Figure 2**.

Table 6-2 Summary of Soil Investigation Methodology

Activity/Item	Details
Fieldwork	The site investigation was conducted 7-8 January 2019. Majority of the planned test bores were able to be completed to the target depth within the natural soil profile.
Drilling Method & Investigation Depth	Test bores were drilled using a ute mounted drill rig and hand auger. Final bore depths were: • 3.2 mBGL for BH101M; • 1.0 mBGL for BH102; • 1.0 mBGL for BH103; • 1.4 mBGL for BH104; • 0.8 mBGL for BH105; • 0.9 mBGL for BH106; • 0.9 mBGL for BH107; • 1.0 mBGL for BH108; • 1.0 mBGL for BH109; • 1.0 mBGL for BH110; • 0.8 mBGL for BH111; • 1.0 mBGL for BH112; • 1.0 mBGL for BH113; • 0.3 mBGL for BH114; • 7.3 mBGL for BH115M; • 2.0 mBGL for BH116; • 2.0 mBGL for BH117; • 8.0 mBGL for BH118M; • 1.2 mBGL for BH119; • 2.0 mBGL for BH120; and • 1.5 mBGL for BH121.

Activity/Item	Details
Soil Logging	Drilled soils were classified in the field with respect to lithological characteristics and evaluated on a qualitative basis for odour and visual signs of contamination. Soil classifications and descriptions were based on Unified Soil Classification System (USCS) and Australian Standard (AS) 4482.1-2005. Bore logs are presented in **Appendix E**.
Field Observations (including visual and olfactory signs of potential contamination)	A summary of field observations is provided, as follows: • No fibre cement sheeting was evident in the 21 boreholes drilled across the site; • Generally there was no olfactory evidence of contamination.
Soil Sampling	• Soil samples were collected using a dry grab method (unused, dedicated nitrile gloves) & placed into laboratory-supplied, acid-washed, solvent-rinsed glass jars. • A small amount of duplicate was collected from each soil samples and placed into zip-lock bag for Photo-ionisation Detector (PID) screening. • Blind field duplicates was separated from the primary samples and placed into glass jars. • A small amount of duplicate was separated from all fill samples and placed into a zip-lock bag for asbestos analysis.
Decontamination Procedures	*Auger Equipment* - The auger rods were decontaminated between sampling locations with potable water until the augers were free of all residual materials. *Sampling Equipment* - The equipment were decontaminated between sampling locations with Decon 90 and potable water until instruments were free of all residual materials.
Sample Preservation	Samples were stored in a chilled (ice-filled) chest, whilst on-site and in transit to the laboratory. All samples were submitted and analysed within the required holding period, as documented in laboratory reports discussed in a **Section 7**.
Management of Soil Cuttings	Soil cuttings were either used as backfill for completed boreholes or disposed in areas of the site not currently in use.
Quality Control & Laboratory Analysis	A number of soil samples were submitted for analysis of previously-identified COPC by SGS Laboratories (SGS). QA/QC testing comprised intra-laboratory duplicates ('field duplicates') tested blind by SGS and an inter-laboratory field duplicate tested blind by Envirolab Services (Envirolab). All samples were transported under strict Chain-of-Custody (COC) conditions and COC certificates and laboratory sample receipt documentation were provided to EI for confirmation purposes, as discussed in **Section 7**.
Soil Vapour Screening	Screening for potential VOCs in collected soil samples was conducted using a Photo-ionisation Detector (PID).

6.5 GROUNDWATER INVESTIGATION

The groundwater investigation works conducted at the site are described in **Table 6-3**. Monitoring well locations are illustrated in **Figure 2**. Seepage was not encountered during the investigation and wells were all dry during the following sampling fieldwork.

Table 6-3 Summary of Groundwater Investigation Methodology

Activity/Item	Details
Fieldwork	Groundwater monitoring wells were installed and developed on 7-8 January 2019; whereas, water level gauging was conducted on 14 January 2019.

Activity/Item	**Details**
Well Construction	Test bores were converted to groundwater monitoring wells as follows: • One, 3.2 m deep, onsite, up-gradient well identified as BH101M; • One 7 m deep, onsite, down-gradient well identified as BH115M; and • One, 8 m deep, onsite, down-gradient well identified as BH118M. Drilled by HartGeo using a ute-mounted solid-flight auger rig. Well construction details are tabulated in **Table 8-2** and documented in the bore logs presented in **Appendix E**. Wells were installed to screen the aquifer in the intervals 1.2 to 3.2 mBGL (BH101M), 4 to 7 mBGL (BH115M) and 5 to 8 mBGL (BH118M). Well construction was in general accordance with the standards described in NUDLC, 2012 and involved the following: • 50 mm, Class 18 uPVC, threaded, machine-slotted screen and casing, with slotted intervals in shallow wells set to screen to at least 500 mm above the standing water level to allow sampling of phase-separated hydrocarbon product, if present; • Base and top of each well was sealed with a uPVC cap; • Annular, graded sand filter was used to approximately 300 mm above top of screen interval; • Granular bentonite was applied above annular filter to seal the screened interval; • Cuttings backfill just below ground level; and • Surface completion comprised of a -0.5 m plastic J-cap closing the well, with a gatic cover at ground level.
Well Development	Following drilling works the monitoring wells were found to be dry and therefore could not be completed.
Well Gauging	Monitoring wells BH101M, BH108M and BH112M were gauged for standing water level (SWL, depth to groundwater) on the 14 January 2019. The wells were found to be dry and no groundwater sampling was performed.

7. DATA QUALITY ASSESSMENT

The assessment of data quality is defined as the scientific and statistical evaluation of environmental data to determine if the data meets the objectives for the project (US EPA 2006). Data quality assessment included an evaluation of the compliance of the field sampling, field and laboratory duplicates and laboratory analytical procedures and an assessment of the accuracy and precision of these data from the laboratory quality control measurements. The findings of the data quality assessment in relation to the current investigation at the site are discussed in detail in **Appendix G**.

The QC measures generated from the field sampling and laboratory analytical program are summarised in **Table 7-1**:

Table 7-1 Quality Control Process

Data Quality	Control	Conformance [Yes, Part, No]	Report Sections
Preliminaries	Data Quality Objectives established	Yes	See DQO/DQI
Field work	Suitable documentation of fieldwork observations including borehole logs, sample register, field notes, calibration forms	Yes	See Appendices
Sampling Plan	Use of relevant and appropriate sampling plan (density, type, and location)	Yes	See sample rationale
	All media sampled and duplicates collected	Yes	Soil vapour not required
	Use of approved and appropriate sampling methods (soil, groundwater, air quality)	Yes	See methodology
	Selection of soil samples according to field PID readings (where VOCs are present)	Yes	See methodology
	Preservation and storage of samples upon collection and during transport to the laboratory	Yes	See methodology
	Appropriate Rinsate, Field and Trip Blanks taken	Yes	See methodology
	Completed field and analytical laboratory sample COC procedures and documentation	Yes	See laboratory reports
Laboratory	Sample holding times within acceptable limits	Yes	See laboratory QA
	Use of appropriate analytical procedures and NATA-accredited laboratories	Yes	See laboratory report
	LOR/PQL low enough to meet adopted criteria	Yes	See laboratory appendix
	Laboratory blanks	Yes	See laboratory QA/QC
	Laboratory duplicates	Yes	See laboratory QA/QC

Data Quality	Control	Conformance [Yes, Part, No]	Report Sections
	Matrix spike/matrix spike duplicates (MS/MSDs)	Yes	See laboratory QA/QC
	Surrogates (or System Monitoring Compounds)	Yes	See laboratory QA/QC
	Analytical results for replicated samples, including field and laboratory duplicates and inter-laboratory duplicates, expressed as Relative Percentage Difference (RPD)	Yes	See QA Tables **Appendix F**
	Checking for the occurrence of apparently unusual or anomalous results, e.g. laboratory results that appear to be inconsistent with field observations or measurements	Yes	See **Appendix E**
Reporting	Report reviewed by senior staff to assess project meets desired quality, EPA guidelines and project outcomes.	Yes	See document control

7.1 QUALITY OVERVIEW

On the basis of the field and analytical data validation procedure employed, the overall quality of the analytical data produced for the site was considered to be of an acceptable standard for interpretive use and preparation of a conceptual site model (CSM).

8. RESULTS

8.1 SITE INVESTIGATION

8.1.1 Site Geology and Subsurface Conditions

The general site geology encountered during the drilling (solid flight auger and hand auger) of the soil investigation boreholes was a shallow layer of anthropogenic filling consisting of gravelly clay overlying residual clay and shale bedrock. The geological information obtained during the investigation is summarised in **Table 8-1** and borehole logs from these works are presented in **Appendix E**.

Table 8-1 Generalised Subsurface Profile

Layer	Description	Depth to top & bottom of layer (mBGL)
Asphalt	-	0.00 – 0.10
Topsoil	Silty clay; low plasticity, dark brown, with trace rootlets, moist and no odour.	0.00 – 0.30
Fill	Silty sand; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour. Gravelly clay; low plasticity, orange, with sub-angular to angular gravels, no odour.	0.10 – 1.50
Natural	Clay; low to medium plasticity, red, no odour. Clay; medium to high plasticity, grey mottled red, no odour.	0.20 – 2.0
Bedrock	Shale; weathered rock, red, no odour. Shale; slightly weathered, grey, no odour.	1.2 – 8.0 +

Notes:
+ Termination depth of borehole

8.1.2 Field Observations and PID Results

Soil samples were obtained from the test bores at various depths ranging between 0.1 m to 2.0 mBGL. All examined soil samples were evaluated on a qualitative basis for odour and visual signs of contamination (e.g. hydrocarbon odours, oil staining, petrochemical filming, asbestos fragments, ash, charcoal, etc.) and the following observations were noted:

- No visual or olfactory evidence of hydrocarbon impacts were noted at any of the borehole locations investigated during this assessment;
- Fill material was evident within all borehole locations sampled during this investigation, from approx. 0.1 to 1.5 mBGL;
- No fibrous cement sheeting was noted within the fill soil profile at 21 boreholes across the site;
- No slag, charcoal / ash was observed in any of the examined fill soils; and

- No elevated VOC concentrations were detected in soil samples, which were field-screened using a portable PID fitted with a 10.9 eV lamp. The PID results are shown in the borehole logs (**Appendix F**).

8.2 GROUNDWATER INVESTIGATION RESULTS

8.2.1 Monitoring Well Construction

A total of three (3) groundwater monitoring wells (BH101M, BH115M and BH118M) were installed across the site on 7-8 January 2019. These groundwater monitoring wells were used by EI on 14 January 2019 during the groundwater monitoring event (GME). Well construction details for the installed groundwater monitoring wells are summarised in **Table 8-2**.

Table 8-2 Monitoring Well Construction Details

Well ID	Bore Depth (mBGL)	Screen Interval (mBGL)	Lithology Screened
BH101M	3.2	1.2 - 3.2	Shale
BH115M	7.0	4.0 - 7.0	Shale
BH118M	8.0	5.0 - 8.0	Shale

Notes:
mBGL - metres below ground level.

8.2.2 Field Observations and Water Test Results

A single GME was conducted on all wells on 14 January 2019.

All three wells are found dry. As a result, no water samples were collected during this investigation.

8.3 LABORATORY ANALYTICAL RESULTS

8.3.1 Soil Analytical Results

A summary of laboratory results showing test sample quantities, minimum/maximum analyte concentrations and samples found to exceed the SILs, is presented in **Table 8-3**. More detailed tabulations of results showing the tested concentrations for individual samples alongside the adopted soil criteria are presented in **Tables T1** at the end of this report. Completed documentation used to track soil sample movements and laboratory receipt (i.e. COC and SRA forms) are copied in **Appendix G** and all laboratory analytical reports for tested soil samples are presented in **Appendix H**.

Table 8-3 Summary of Soil Analytical Results

No. of primary samples	Analyte	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Sample locations exceeding investigation levels
Hydrocarbons				
29	Benzene	<0.1	<0.1	None
29	Toluene	<0.1	<0.1	None
29	Ethyl benzene	<0.1	<0.1	None
29	Total xylenes	<0.3	<0.3	None
29	F1	<25	<25	None
29	F2	<25	<25	None
29	F3	<90	<90	None
29	F4	<120	<120	None
PAHs				
29	Carcinogenic PAHs	<0.3	0.4	None
29	Benzo(a)pyrene	<0.1	0.2	None
29	Total PAHs	<0.8	2.6	None
29	Naphthalene	<0.1	<0.1	None
Heavy Metal				
29	Arsenic	<1	130	BH119_0.2-0.3 (130mg/kg) exceeding EIL criteria.
29	Cadmium	<0.3	1.9	None
29	Chromium (Total)	2.5	68	None
29	Copper	0.8	59	None
29	Lead	4	340	None
29	Mercury	<0.05	31	None
2	Methyl Mercury	<0.01	<0.01	None
29	Nickel	<0.5	33	None
29	Zinc	2.8	100	None
OCPs				
19		<1	<1	None
OPPs				
19		<1.7	<1.7	None
PCBs				
19		<1	<1	None
Asbestos				
19	Asbestos	No asbestos detected	No asbestos detected	None

Heavy Metals

As shown in **Table T1**, all heavy metals (HM) concentrations were below the corresponding NEPM 2013 health-based HIL-B&C levels and the ecological based soil criteria (EILs), with the exception of fill sample BH119_0.2-0.3 exceeding the EIL criteria. However the 95% UCL for arsenic in all fill samples was calculated to be 35.26 mg/kg and below the adopted EIL criteria (105mg/kg).

TRHs

As shown in **Table T1**, all total recoverable hydrocarbons (TRH) concentrations were below the corresponding NEPM 2013 health-based HSL-A&B criteria.

BTEX and Naphthalene

As shown in **Table T1**, all BTEX and naphthalene concentrations were below the corresponding NEPM 2013 health-based HSL - A&B criteria.

PAHs

As shown in **Table T1**, all PAHs concentrations were below the corresponding NEPM 2013 health-based HIL - B&C levels.

OCPs, OPPs and PCBs

As shown in **Table T1**, all OCPs, OPPs and PCBs concentrations were below the corresponding NEPM 2013 health-based HIL-B&C levels.

Asbestos

All tested samples concentrations were below the corresponding NEPM 2013 health-based HIL-A levels.

9. SITE CHARACTERISATION

9.1 REVIEW OF CONCEPTUAL SITE MODEL

On the basis of investigation findings the CSM discussed in **Section 4** was considered to appropriately identify contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Previously known data gaps, as outlined in **Section 4.6** have largely been addressed; however, the following remaining data gaps require closer in subsequent investigation works:

- The quality of filling and natural soils beneath building structure areas of the site not accessible during this investigation; and
- Potential presence of hazardous materials present within the existing site structures.

9.2 SOIL QUALITY

The drilling completed by EI on 7-8 January 2019, indicated that fill material encountered across the site was within corresponding applicable human health and ecological based criterions.

9.3 GROUNDWATER QUALITY

While groundwater was not encountered and sampled during the investigation, EI consider local groundwater resource is unlikely to represent a significant risk of harm human health or the surrounding environment based on the following points:

- The two underground storage tanks identified in SafeWork NSW records were outside the study area, and approximate 400m north-west and hydraulically down-gradient of the site;
- Potential offsite sources of contamination (i.e. service stations sites) were located hydraulically down-gradient of the site; and
- Mobile contamination sources were not identified in the investigation area, and mobile contaminants, including volatile TRHs and BTEX compounds, were not reported in laboratory analysed soil samples.

In light of the above, further groundwater investigation has not been considered.

10. CONCLUSIONS

The property located at Pymble Golf Club 4, 12-14 Cowan Road, St Ives NSW was the subject of a Detailed Site Investigation (DSI) that was conducted in order to assess the nature and degree of on-site contamination associated with current and former uses of the property. Based on the findings of this assessment it was concluded that:

- The site, which fronts Cowan Road to the east, consists of four allotments (Lot 1 DP511821, Lot B DP368565, Lot 1, 2, and 3 DP531533), covering a total area of 10,000 m². The site is occupied by Pymble Golf Club clubhouse and car parking facilities, a bowling green and two residential dwellings;

- Historical records indicated that the proposed development area has been used as part of a golf club since early 1920s. The surrounding areas were predominantly rural-residential with orchard activity up until at least late 1930s. In the early 1940s, the site was further developed as a golf clubhouse and for residential purpose. Site use has remained the same since the 1940s;

- The site was free of statutory notices issued by the NSW EPA and was not recorded on the List of NSW Contaminated Sites Notified to EPA or the POEO register;

- SafeWork NSW records revealed the presence of two underground storage tanks and three roofed store areas for herbicides, fungicides and pesticides on the larger golf course site. However, based on the attached drawing in the records, the locations of the dangerous goods depots were outside the study area, and approximate 400 m north-west and hydraulically down-gradient of the proposed development area;

- The sub-surface layers comprised primarily of gravelly clay and silty sand fill materials, overlying residual clays (low to high plasticity) and weathered shale bedrock;

- Soil sampling and analysis were conducted at twenty-one borehole locations (BH101M to BH121) down to a maximum depth of 8.0 mBGL;

  – Soil samples collected and laboratory analysed from the twenty-one borehole locations were below the adopted human-health investigation and ecological criteria.

- Three groundwater monitoring wells (BH101M, BH115M and BH118M) were installed during the investigation. Groundwater was not encountered during the investigation as monitoring wells were dry. Based on information gathered during the PSI (EI, 2018) and laboratory analytical results obtained during this investigation, groundwater is unlikely to represent a significant risk of harm to human health or the environment;

- Based on the investigation findings, the CSM appropriately identified contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Most previously known data gaps have largely been addressed, however, the following data gaps that remain will require closure by further investigation:

  – The quality of soils beneath building structure areas of the site not accessible during this investigation; and

  – Potential presence of hazardous materials present within existing structures on the site.

Based on the findings from of this DSI, conducted in accordance with the investigation scope agreed with the Client, and with consideration of the Statement of Limitations (**Section 12**), contamination exceeding human-health investigation criteria was not identified. While some data gaps remain that require closure by further intrusive investigation, the available quantitative soil data does not indicate the presence of contamination that would preclude the site from being rezoned for residential purposes.

Based on the findings of this investigation, EI consider the site is suitable for the proposed redevelopment, subject to the implementation of a number of recommendations detailed in **Section 11**.

11. RECOMMENDATIONS

Based on the findings of this investigation, the following recommendations are provided:

- Prior to site demolition, carry out a Hazardous Materials Survey on existing site structures to identify potentially hazardous building products that may be released to the environment during demolition;
- Following the completion of demolition works and the removal of demolition debris, a clearance inspection be undertaken by a qualified occupational hygienist and subsequent clearance certificate issued;
- Following demolition, intrusive soil investigation is to be completed within the building footprints of the previously in accessible structures to characterise soil quality;
- Any material being removed from site (including virgin excavated natural materials (VENM)) as part of the proposed development works is to be classified for off-site disposal in accordance the EPA (2014) *Waste Classification Guidelines*;
- Any material being imported to the site should be assessed for potential contamination in accordance with NSW EPA guidelines as being suitable for the intended use or be classified as VENM; and
- Should unexpected finds (contamination) be encountered during redevelopment works a qualified environmental consultant be engaged to inspect the finds and offer appropriate guidance.

12. STATEMENT OF LIMITATIONS

The findings presented in this report are the result of discrete and specific sampling methodologies used in accordance with best industry practices and standards. Due to the site-specific nature of soil sampling from point locations, it is considered likely that all variations in subsurface conditions across a site cannot be fully defined, no matter how comprehensive the field investigation program.

While normal assessments of data reliability have been made, EI assumes no responsibility or liability for errors in any data obtained from previous assessments conducted on site, regulatory agencies (e.g. Council, EPA), statements from sources outside of EI, or developments resulting from situations outside the scope of works of this project.

Despite all reasonable care and diligence, the ground conditions encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change at any time in response to variations in natural conditions, chemical reactions and other events, e.g. groundwater movement and or spillages of contaminating substances. These changes may occur subsequent to EI's investigations and assessment.

EI's assessment is necessarily based upon the result of the site investigation and the restricted program of surface and subsurface sampling, screening and chemical testing which was set out in the proposal. Neither EI, nor any other reputable consultant, can provide unqualified warranties nor does EI assume any liability for site conditions not observed or accessible during the time of the investigations.

This report was prepared for the above named client and no responsibility is accepted for use of any part of this report in any other context or for any other purpose or by other third parties. This report does not purport to provide legal advice.

This report and associated documents remain the property of EI subject to payment of all fees due for this assessment. The report shall not be reproduced except in full and with prior written permission by EI.

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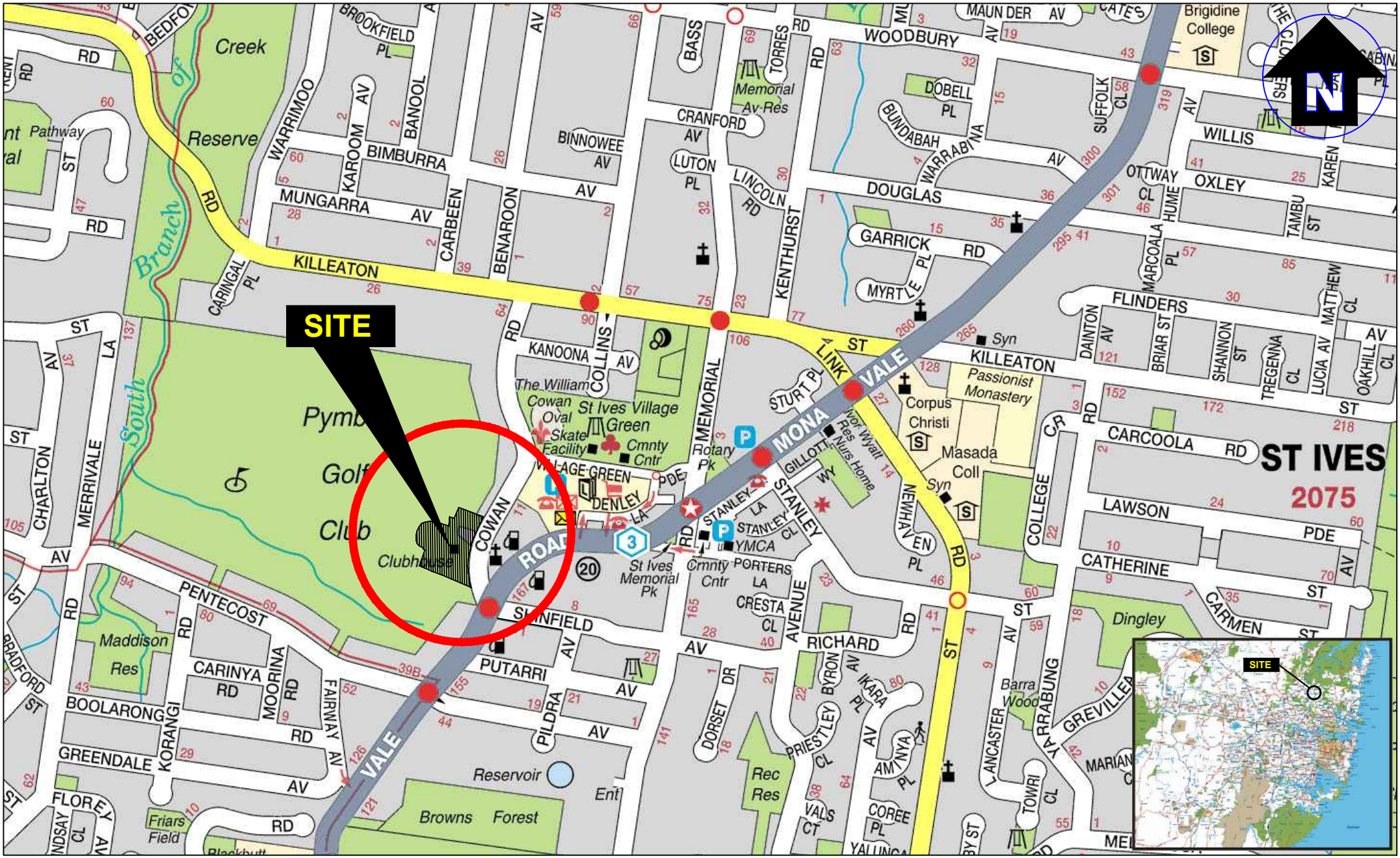
ABBREVIATIONS

ACM	Asbestos-containing materials
ASS	Acid sulfate soils
ANZAST	Australian and New Zealand and Australian State and Territory Governments
B(a)P	Benzo(a)pyrene (a PAH compound), - B(a)P TEQ Toxicity Equivalent Quotient
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CLM	Contaminated Land Management
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DEC	Department of Environment and Conservation, NSW (see OEH)
DECC	Department of Environment and Climate Change, NSW (see OEH)
DECCW	Department of Environment, Climate Change and Water, NSW (see OEH)
DA	Development Application
DNAPL	Dense, non-aqueous phase liquid
DO	Dissolved Oxygen
DP	Deposited Plan
EC	Electrical Conductivity
Eh	Redox potential
EIL	Ecological Investigation Level
EMP	Environmental Management Plan
EPA	Environment Protection Authority
ESL	Ecological Screening Level
F1	TRH C_6 – C_{10} less the sum of BTEX concentrations (Ref. NEPM 2013, Schedule B1)
F2	TRH >C_{10} – C_{16} less the concentration of naphthalene (Ref. NEPM 2013, Schedule B1)
GIL	Groundwater Investigation Level
GME	Groundwater Monitoring Event
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
km	Kilometres
LNAPL	Light, non-aqueous phase liquid (also referred to as PSH)
m	Metres
mAHD	Metres Australian Height Datum
mBGL	Metres Below Ground Level
mg/L	Milligrams per litre
µg/L	Micrograms per litre
mV	Millivolts
MW	Monitoring well
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environment and Heritage, NSW (formerly DEC, DECC, DECCW)
OPP	Organ-phosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PFAS	Per or poly-fluoroalkyl substances

pH	Measure of the acidity or basicity of an aqueous solution
POEO	Protection of the Environment Operations
PQL	Practical Quantitation Limit (limit of detection for respective laboratory instruments)
PSH	Phase-separated hydrocarbons (also referred to as LNAPL)
QA/QC	Quality Assurance / Quality Control
SRA	Sample receipt advice (document confirming laboratory receipt of samples)
SWL	Standing Water Level
TDS	Total dissolved solids (a measure of water salinity)
TPH	Total Petroleum Hydrocarbons (superseded term equivalent to TRH)
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)
UCL	Upper Confidence Limit of the mean
USEPA	United States Environmental Protection Agency
UPSS	Underground Petroleum Storage Systems
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds (specific organic compounds which are volatile)

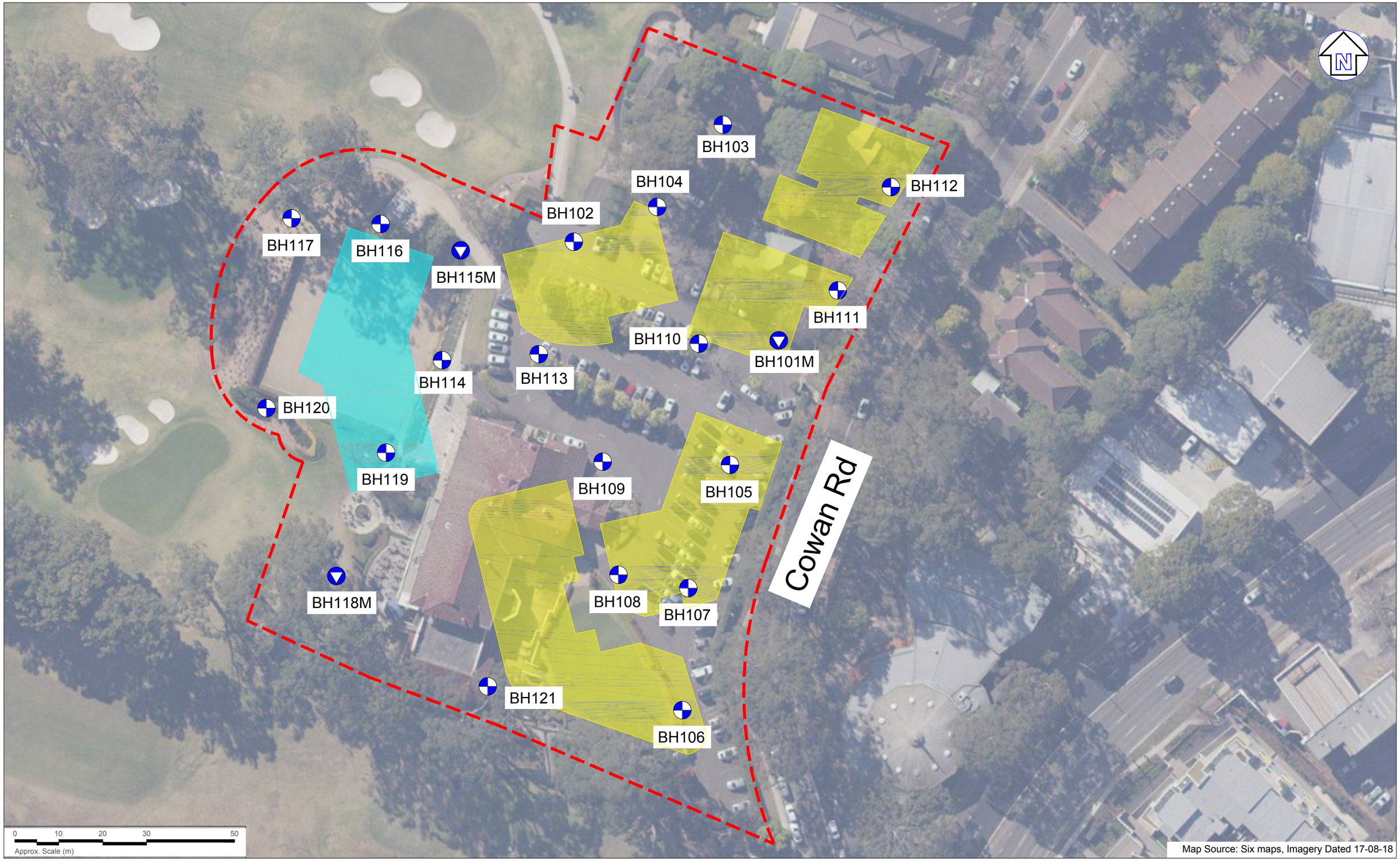
FIGURES



eiaustralia Contamination | Remediation | Geotechnical Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088	Drawn:	L.C.	**Pymble Golf Club C/- DMPS** Detailed Site Investigation Pymble Golf Club 4, 12-14 Cowan Road, St Ives NSW Site Locality Plan
	Approved:	-	
	Date:	-	
	Scale:	Not To Scale	

Figure: 1

Project: E23975.E02.Rev0



LEGEND

- Approximate site boundary
- Approximate borehole location
- Approximate monitoring well boundary
- Approximate proposed Residential building footprint
- Approximate proposed new Club house footprint

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Approved:	N.F.
Date:	15/03/2019

Pymble Golf Club C/- DMPS
Detailed Site Investigation
Pymble Golf Club 4, 12-14 Cowan Road, St Ives NSW
Sampling Location Plan

Figure: 2

Project: E23975.E02_Rev1

TABLES

Table T1 - Summary of Soil Analytical results

E23975 - St Ives

Sample ID	Assessment Criteria	Material	Date	Heavy Metals									PAHs				BTEX				TRH				Pesticides		Total PCBs	Asbestos
				As	Cd	Cr	Cu	Pb	Hg	Methyl Hg	Ni	Zn	Carcinogenic PAHs (as B(a)P TEQ)	Benzo(a)pyrene	Total PAHs	Naphthalene	Benzene	Toluene	Ethylbenzene	Total Xylenes	F1	F2	F3	F4	OCPs	OPPs		Presence / absence
BH101M_0.5-0.6	HIL B/HSL A&B	Natural	7/01/2019	6	<0.3	68	1.2	8	0.07	NA	2.6	8.1	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH102_0.2-0.3	HIL B/HSL A&B	Fill		7	<0.3	21	11	64	0.13	NA	2.9	47	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH102_0.9-1.0	HIL B/HSL A&B	Natural		8	<0.3	30	0.5	10	<0.05	NA	<0.5	5	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH103_0.1-0.2	HIL C/HSL C/EIL/ESL	Fill		6	<0.3	35	1	13	<0.05	NA	0.5	9.9	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH103_0.6-0.7	HIL C/HSL C/EIL/ESL	Natural		7	1.1	27	59	110	0.54	NA	3.2	99	0.4	0.2	2.6	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH104_0.2-0.3	HIL C/HSL C/EIL/ESL	Fill		4	<0.3	42	33	41	0.11	NA	33	50	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH105_0.5-0.6	HIL B/HSL A&B	Natural		6	<0.3	57	1.1	8	<0.05	NA	2.2	7.4	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH106_0.2-0.3	HIL B/HSL A&B	Fill		7	<0.3	26	2.2	19	<0.05	NA	1.4	8.3	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH107_0.5-0.6	HIL B/HSL A&B	Natural		7	<0.3	53	1.1	12	0.06	NA	1.4	19	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH108_0.1-0.2	HIL B/HSL A&B	Fill		5	<0.3	30	2.4	12	<0.05	NA	1.4	6.9	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH109_0.2-0.3	HIL C/HSL C/EIL/ESL	Fill		7	<0.3	36	2.8	28	<0.05	NA	4.9	15	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH110_0.2-0.3	HIL B/HSL A&B	Fill		7	<0.3	44	5.3	21	0.09	NA	3.3	20	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH111_0.5-0.6	HIL B/HSL A&B	Natural		4	<0.3	61	2.1	9	0.07	NA	2.4	8.6	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH112_0.1-0.2	HIL B/HSL A&B	Natural		7	<0.3	34	15	100	0.19	NA	3.1	63	<0.3	0.1	1.6	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH113_0.5-0.6	HIL C/HSL C/EIL/ESL	Natural	8/01/2019	6	<0.3	24	0.8	14	<0.05	NA	0.6	7.2	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH114_0.1-0.2	HIL C/HSL C/EIL/ESL	Topsoil		32	0.5	18	12	41	0.59	NA	2.3	70	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH115M_0.2-0.3	HIL C/HSL C/EIL/ESL	Topsoil		17	<0.3	12	9.3	18	0.16	NA	1.6	31	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH116_0.2-0.3	HIL C/HSL C/EIL/ESL	Fill		4	<0.3	2.5	2.4	4	<0.05	NA	1.3	7.1	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH116_0.8-0.9	HIL C/HSL C/EIL/ESL	Fill		7	<0.3	3.8	6.8	12	0.59	NA	1.1	20	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH117_0.1-0.2	HIL C/HSL C/EIL/ESL	Fill		11	<0.3	5.8	8.6	9	0.16	NA	0.8	9.8	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH117_1.0-1.1	HIL C/HSL C/EIL/ESL	Fill		9	<0.3	5.4	11	9	<0.05	NA	0.9	10	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH117_1.9-2.0	HIL C/HSL C/EIL/ESL	Natural		7	<0.3	6	4.1	7	<0.05	NA	<0.5	3.2	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH118M_0.2-0.3	HIL C/HSL C/EIL/ESL	Fill		8	<0.3	14	5	24	2.40	NA	2.7	100	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH119_0.2-0.3	HIL D/HSL D	Fill		130	1.9	17	5.3	340	31.00	<0.01	1.4	33	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH119_1.0-1.1	HIL D/HSL D	Natural		6	<0.3	4.7	6.8	5	0.35	NA	<0.5	2.8	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
BH120_0.1-0.2	HIL C/HSL C/EIL/ESL	Fill		32	0.6	11	7.1	44	4.2	<0.01	3.2	63	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH120_1.4-1.5	HIL C/HSL C/EIL/ESL	Fill		27	<0.3	16	2.9	14	<0.05	NA	2.2	8.1	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH121_0.2-0.3	HIL C/HSL C/EIL/ESL	Fill		21	0.9	14	12	69	14	NA	3.1	35	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH121_1.4-1.5	HIL C/HSL C/EIL/ESL	Natural		5	<0.3	9.7	6.5	11	<0.05	NA	<0.5	3.1	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.
Statistical Analysis																												
Maximum concentration				130	1.9	68	59	340	31	<0.01	33	100	0.4	0.2	2.6	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
95% UCL concentrations - Fill Samples Only				35.26	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
SILs																												
HIL B - Residential				500	150	500 Cr(VI)	30,000	1,200	120	30	1,200	60,000	4		400										600		1	
HIL C - Recreational/Open Space				300	90	300 Cr(VI)	17,000	600	80	13	1,200	30,000	3		300										400		1	
HIL D - Commercial/Industrial				3000	900	3600 Cr(VI)	240,000	1,500	730	180	6,000	400,000	40		4000										3600		7	
HSL A & B - Low to high density residential Soil texture classification – Clay [1]				Source depths (0 m to <1 m. BGL)													5	0.7	480	NL	110	50	280					
				Source depths (1 m to <2 m. BGL)													NL	1	NL	NL	310	90	NL					
				Source depths (2m to <4 m. BGL)													NL	2	NL	NL	NL	150	NL					
				Source depths (4 m+)													NL	3	NL	NL	NL	290	NL					
HSL C - Recreational/Open space Soil texture classification –Clay [1]				Source depths (0 m to <1 m. BGL)													NL	NL	NL	NL	NL	NL	NL					
				Source depths (1 m to <2 m. BGL)													NL	NL	NL	NL	NL	NL	NL					
				Source depths (2m to <4 m. BGL)													NL	NL	NL	NL	NL	NL	NL					
				Source depths (4 m+)													NL	NL	NL	NL	NL	NL	NL					
HSL D - Commercial / Industrial Soil texture classification – Clay [1]				Source depths (0 m to <1 m. BGL)													NL	4	NL	NL	NL	310	NL					
				Source depths (1 m to <2 m. BGL)													NL	6	NL	NL	NL	480	NL					
				Source depths (2m to <4 m. BGL)													NL	9	NL	NL	NL	NL	NL					
				Source depths (4 m+)													NL	20	NL	NL	NL	NL	NL					
EILs / ESLs - Urban Residential and Public Open Space [1] [2]				105		408	122	1,200			175	255		0.7			170	65	105	125	45	180	120	1300	5600	180		
Management Limits – *Residential, parkland and public open space* [1]																						800	1,000	3,500	10,000			

Notes:

All results are recorded in mg/kg (unless otherwise stated)

HIL B	NEPC 1999 Amendment 2013 'HIL B' Health Based Investigation Levels applicable for residential exposure settings with minimal opportunities for garden soil access.
HIL C	NEPC 1999 Amendment 2013 'HIL C' Health Based Investigation Levels applicable for recreational/open space settings.
HIL D	NEPC 1999 Amendment 2013 'HIL D' Health Based Investigation Levels applicable for commercial/industrial.
HSL A&B	NEPC 1999 Amendment 2013 'HSL A&B' Health Based Screening Levels based on vapour intrusion values applicable for low to high density residential settings.
HSL C	NEPC 1999 Amendment 2013 'HSL C' Health Based Screening Levels based on vapour intrusion values applicable for recreational/open space settings.
HSL D	NEPC 1999 Amendment 2013 'HSL D' Health Based Screening Levels based on vapour intrusion values applicable for commercial / industrial settings.
NA	'Not Analysed' i.e. the sample was not analysed.
NL	'Not Limiting' - The soil vapour limit exceeds the soil concentration at which the pore water phase cannot dissolve any more of the individual chemical.
1	Majority of the fill to be found as clayey material. Therefore, fine grained soil (clay) values were applied.
2	EIL criteria is derived from a site specific Added Contaminant Limit (ACL) with the Ambient Background Concentration (ABC) for an old NSW and low traffic suburb. In lack of physiochemical properties for soils across the site, a site specific ACL criteria for heavy metals based on averaged physiochemical properties presented in Chapman and Murphy (2002) for the Glenorie (gn) soil landscape.
F1	To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
F2	To obtain F2 subtract Naphthalene from the >C10-C16 fraction.
F3	(>C16-C34)
F4	(>C34-C40)

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Table I3 **Soil RPD values** **E23975 - St Ives**

Sample identification	Description	Date	TRH				BTEX				Heavy Metals							
			F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Xylene (total)	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc
Intra-laboratory Duplicate - Soil Investigation																		
BH102_0.2-0.3	Site Investigation	7/01/2019	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	7	<0.3	21	11	64	0.13	2.9	47
QD1	BFD of BH102_0.2-0.3		<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	4	<0.3	17	39	41	<0.05	20	42
RPD		-	*0.00*	*0.00*	*NA*	*NA*	*0.00*	*0.00*	*0.00*	*0.00*	**54.55**	*0.00*	*21.05*	**112.00**	*43.81*	**103.23**	**149.34**	*11.24*
Inter-laboratory Duplicate - Soil Investigation																		
BH102_0.2-0.3	Site Investigation	7/01/2019	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	7	<0.3	21	11	64	0.13	2.9	47
QT1	ILD of of BH102_0.2-0.3		<25	<50	<100	<100	<0.2	<0.5	<1	<3	5	<0.4	25	26	49	0.1	10	42
RPD		-	*0.00*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*33.33*	*NA*	*17.39*	**81.08**	*26.55*	*26.09*	**110.08**	*11.24*
Rinsate Blanks																		
BH100_QR1	Equipment rinsate	8/1/2019	<50	<60	<500	<500	<0.5	1	<0.5	<1.5	<1	<0.1	<1	<1	<1	<0.1	<1	<5
Trip Spikes																		
BH100_QTS1	Soil trip spike	8/1/2019	-	-	-	-	[97%]	[95%]	[107%]	[108%]	-	-	-	-	-	-	-	-
Trip Blanks																		
BH100_QTB1	Soil trip blank	8/1/2019	-	-	-	-	<0.1	<0.1	<0.1	<0.3	-	-	-	-	-	-	-	-

NOTE: All results are reported in mg/kg (soil) or µg/L (water)

66.67	RPD calculated by halving detection limit exceeds 30-50% range referenced from AS4482.1 (2005)
52.87	RPD exceeds 30-50% range referenced from AS4482.1 (2005)

F1 = TRH C6-C10 less the sum of BTEX
F2 = TRH >C10-C16 less naphthalene
F3 = TRH >C16-C34
F4 = TRH >C34-C40

[1] Value shown is the lowest recovery value reported for xylenes

APPENDIX A
Proposed Development Plans

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN
1ST FAIRWAY
1ST TEE SPRAY LINE
LOWER TERRACE BELOW
UPPER TERRACE
CLUB HOUSE GROUND FLOOR
AREA: 1180 m²
UPPER TERRACE
PICK UP / DROP OFF
EXISTING PATH
6TH GREEN
PROPOSED DEVELOPMENT SITE #1 BOUNDARY
13TH TEE
PUTTING GREEN (700m² APPROX.)
RAMP TO B1
OUTLINE OF EXISTING CLUBHOUSE
EXISTING PATH
PROPOSED LOCATION OF 1ST TEE
PROPOSED DEVELOPMENT SITE #2 BOUNDARY
LAND AVAILABLE FOR CLUB USE
1ST TEE
RES. COMMON OPEN SPACE
RES. COMMON ROOM
LINE OF BALCONY ABOVE
6000
12155
10225
10000
BUILDING A
BUILDING B
BUILDING C
BUILDING D
CLUB ENTRY DRIVE
RAMP TO RESIDENTIAL BASEMENT
3 m
9 m
8 m
10 m
12 m
MONA VALE ROAD
COWAN ROAD
PRELIMINARY

Pymble Golf Club
Cowan Rd, St. Ives NSW
2075

INDICATIVE DESIGN_GROUND FLOOR

0 m 10 20 30

SCALE: 1 : 500 @ A1
JOB NO: 1415
DRAWING No. A100
REV H

ISSUE	AMENDMENT DESCRIPTION	DATE
H	CLIENT REVIEW	12.02.2019
G	FOR REVIEW	22.01.2019
F	COUNCIL REVIEW	04.12.2018
E	DRAFT FOR LIENT REVIEW	21.11.2018
D	DRAFT FOR CLIENT REVIEW	16.10.2018
C	DRAFT	12.10.2018

MAYOH

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN

1ST FAIRWAY

1ST TEE SPRAY LINE

CLUB HOUSE LEVEL 1
AREA: 1180 m²

EXISTING PATH

6TH GREEN

PROPOSED DEVELOPMENT SITE #1 BOUNDARY

13TH TEE

PUTTING GREEN (700m² APPROX.)

OUTLINE OF EXISTING CLUBHOUSE

EXISTING PATH

PROPOSED LOCATION OF 1ST TEE

PROPOSED DEVELOPMENT SITE #2 BOUNDARY

LAND AVAILABLE FOR CLUB USE

1ST TEE

BUILDING A

BUILDING B

BUILDING C

BUILDING D

9 m

6 m

10 m

12 m

CLUB ENTRY DRIVE

COWAN ROAD

MONA VALE ROAD

PRELIMINARY

Pymble Golf Club

Cowan Rd, St. Ives NSW 2075

INDICATIVE DESIGN_LEVEL 1

0 m 10 20 30

SCALE: 1 : 500 @ A1

JOB NO: 1415

DRAWING No. A101

REV H

ISSUE	AMENDMENT DESCRIPTION	DATE
H	CLIENT REVIEW	12.02.2019
G	FOR REVIEW	22.01.2019
F	COUNCIL REVIEW	04.12.2018
E	DRAFT FOR LIENT REVIEW	21.11.2018
D	DRAFT FOR CLIENT REVIEW	16.10.2018
C	DRAFT FOR CLIENT REVIEW	10.10.2018

MAYOH

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN

1ST FAIRWAY

1ST TEE SPRAY LINE

CLUB HOUSE LEVEL 2

ROOF TERRACE AREA: 240 m²

AREA: 480 m²

EXISTING PATH

6TH GREEN

PROPOSED DEVELOPMENT SITE #1 BOUNDARY

13TH TEE

PUTTING GREEN (700m² APPROX.)

OUTLINE OF EXISTING CLUBHOUSE

EXISTING PATH

PROPOSED LOCATION OF 1ST TEE

PROPOSED DEVELOPMENT SITE #2 BOUNDARY

LAND AVAILABLE FOR CLUB USE

1ST TEE

BUILDING A

BUILDING B

BUILDING C

BUILDING D

9 m

6 m

10 m

12 m

MONA VALE ROAD

COWAN ROAD

PRELIMINARY

Pymble Golf Club

Cowan Rd, St. Ives NSW 2075

INDICATIVE DESIGN_LEVEL 2

0 m 10 20 30

SCALE: 1 : 500 @ A1

JOB NO: 1415

DRAWING No. A102

REV G

ISSUE	AMENDMENT DESCRIPTION	DATE
G	CLIENT REVIEW	12.02.2019
F	FOR REVIEW	22.01.2019
E	COUNCIL REVIEW	04.12.2018
D	DRAFT FOR LIENT REVIEW	21.11.2018
C	DRAFT FOR CLIENT REVIEW	16.10.2018
B	DRAFT FOR CLIENT REVIEW	10.10.2018

MAYOH

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN

1ST FAIRWAY

1ST TEE SPRAY LINE

ROOF TERRACE OF LEVEL BELOW

CLUB HOUSE BELOW

EXISTING PATH

6TH GREEN

PROPOSED DEVELOPMENT SITE #1 BOUNDARY

PUTTING GREEN (700m² APPROX.)

ROOF BELOW

13TH TEE

OUTLINE OF EXISTING CLUBHOUSE

EXISTING PATH

PROPOSED LOCATION OF 1ST TEE

PROPOSED DEVELOPMENT SITE #2 BOUNDARY

LAND AVAILABLE FOR CLUB USE

1ST TEE

3B

2B

BUILDING A

BUILDING B

BUILDING C

BUILDING D

14 m

9 m

10 m

10 m

12 m

MONA VALE ROAD

COWAN ROAD

PRELIMINARY

Pymble Golf Club

Cowan Rd, St. Ives NSW
2075

INDICATIVE DESIGN_LEVEL 3

0 m 10 20 30

SCALE: 1 : 500 @ A1

JOB NO: 1415

DRAWING No. A103

REV G

ISSUE	AMENDMENT DESCRIPTION	DATE
G	CLIENT REVIEW	12.02.2019
F	FOR REVIEW	22.01.2019
E	COUNCIL REVIEW	04.12.2018
D	DRAFT FOR LIENT REVIEW	21.11.2018
C	DRAFT FOR CLIENT REVIEW	16.10.2018
B	DRAFT FOR CLIENT REVIEW	10.10.2018

MAYOH

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN

1ST FAIRWAY

1ST TEE SPRAY LINE

ROOF BELOW

EXISTING PATH

6TH GREEN

PROPOSED DEVELOPMENT SITE #1 BOUNDARY

PUTTING GREEN (700m² APPROX.)

13TH TEE

OUTLINE OF EXISTING CLUBHOUSE

EXISTING PATH

PROPOSED LOCATION OF 1ST TEE

PROPOSED DEVELOPMENT SITE #2 BOUNDARY

LAND AVAILABLE FOR CLUB USE

3B

3B

3B

3B

ROOF BELOW

ROOF BELOW

BUILDING A

BUILDING B

BUILDING C

BUILDING D

1ST TEE

COWAN ROAD

MONA VALE ROAD

PRELIMINARY

Pymble Golf Club

Cowan Rd, St. Ives NSW 2075

INDICATIVE DESIGN_LEVEL 4

0 m 10 20 30

SCALE: 1 : 500 @ A1

JOB NO: 1415

DRAWING No. A104

REV G

ISSUE	AMENDMENT DESCRIPTION	DATE
G	CLIENT REVIEW	12.02.2019
F	FOR REVIEW	22.01.2019
E	COUNCIL REVIEW	04.12.2018
D	DRAFT FOR LIENT REVIEW	21.11.2018
C	DRAFT FOR CLIENT REVIEW	16.10.2018
B	DRAFT FOR CLIENT REVIEW	10.10.2018

MAYOH

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN

1ST FAIRWAY

1ST TEE SPRAY LINE

CLUB HOUSE
LOWER GROUND
FLOOR AREA: 1190 m²

TERRACE

LINE OF LEVEL ABOVE

TERRACE

LOBBY

35 SPACES

RL 166.900

PLANT / STORAGE

SERVICE LIFT

LOADING

GARBAGE

PLANT

RAMP TO GROUND

RAMP TO B2

1:20

RL 167.500

PUTTING GREEN (700m² APPROX.)

RL 168.000

STORAGE

55 SPACES

1:14

STORAGE

RL 167.900

RAMP TO B1

TERRACE

LOADING

GARBAGE

PLANT

1:20

RL 168.900

STORE

OUTLINE OF EXISTING CLUB HOUSE

ST

GARBAGE

LOADING

RL 168.900

38 SPACES

PLANT

RAMP TO GROUND

1:20

STORAGE

RAMP TO B2

EXISTING PATH

6TH GREEN

PROPOSED DEVELOPMENT SITE #1 BOUNDARY

OUTLINE OF EXISTING CLUBHOUSE

EXISTING PATH

PROPOSED LOCATION OF 1ST TEE

PROPOSED DEVELOPMENT SITE #2 BOUNDARY

LAND AVAILABLE FOR CLUB USE

1ST TEE

COWAN ROAD

MONA VALE ROAD

PRELIMINARY

Pymble Golf Club
Cowan Rd, St. Ives NSW
2075

INDICATIVE DESIGN_LOWER GROUND / BASEMENT 1

0 m 10 20 30

SCALE: 1 : 500 @ A1

JOB NO: 1415

DRAWING No. A105

REV E

ISSUE	AMENDMENT DESCRIPTION	DATE
E	CLIENT REVIEW	12.02.2019
D	FOR REVIEW	22.01.2019
C	DRAFT FOR CLIENT REVIEW	16.10.2018
B	DRAFT FOR CLIENT REVIEW	10.10.2018
A	DRAFT FOR CLIENT REVIEW	08.10.2018

MAYOH

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN

1ST FAIRWAY

CLUB HOUSE

PUTTING GREEN ABOVE

PROPOSED DEVELOPMENT SITE #1 BOUNDARY

PROPOSED LOCATION OF 1ST TEE

PROPOSED DEVELOPMENT SITE #2 BOUNDARY

OUTLINE OF EXISTING CLUB HOUSE

OUTLINE OF B1 ABOVE

MONA VALE ROAD

COWAN ROAD

PRELIMINARY

Pymble Golf Club
Cowan Rd, St. Ives NSW
2075

INDICATIVE DESIGN_BASEMENT 2

0 m 10 20 30

SCALE: 1 : 500 @ A1

JOB NO: 1415

DRAWING No. A106

REV E

ISSUE	AMENDMENT DESCRIPTION	DATE
E	CLIENT REVIEW	12.02.2019
D	FOR REVIEW	22.01.2019
C	DRAFT FOR CLIENT REVIEW	16.10.2018
B	DRAFT FOR CLIENT REVIEW	10.10.2018
A	DRAFT FOR CLIENT REVIEW	08.10.2018

MAYOH

DEVELOPMENT SUMMARY - OPTION 4D (APARTMENTS)	
APPROX. SITE AREA	: 9773 sqm
EST. GROSS FLOOR AREA (GFA)	: 9782 sqm
EST. FSR	: 1.00
EST. NET SALEABLE AREA (NSA)	: 8886 sqm
TOTAL RES COMMON OPEN SPACE	: 5226 sqm
TOTAL DEEP SOIL %	: 55 % *
EST. RES. UNITS	: 77 Apartments at 113 sqm avg

* SUBJECT TO FUTURE REDESIGN OF BASEMENT

LEGEND

- SITE BOUNDARY
- EXISTING CLUB HOUSE
- PROPOSED DEVELOPMENT BOUNDARY
- TREE PROTECTION ZONE (TPZ) RADIUS
- STRUCTURAL ROOT ZONE (SRZ) RADIUS
- TREES MUST BE RETAINED (BIODIVERSITY MAPPED)
- OTHER TREES TO BE RETAINED
- RESIDENTIAL FENCING
- PEDESTRIAN RESIDENTIAL ENTRY
- BALCONY / TERRACE

18TH GREEN

1ST FAIRWAY

CLUB HOUSE

PLANT / STORAGE

90 SPACES

120

PLANT

POOL EQUIP.

6TH GREEN

PROPOSED DEVELOPMENT SITE #1 BOUNDARY

OUTLINE OF EXISTING CLUB HOUSE

OUTLINE OF B2 LEVEL ABOVE

PROPOSED DEVELOPMENT SITE #2 BOUNDARY

1ST TEE

COWAN ROAD

MONA VALE ROAD

PRELIMINARY

Pymble Golf Club

Cowan Rd, St. Ives NSW 2075

INDICATIVE DESIGN_BASEMENT 3

0 m 10 20 30

SCALE: 1 : 500 @ A1

JOB NO: 1415

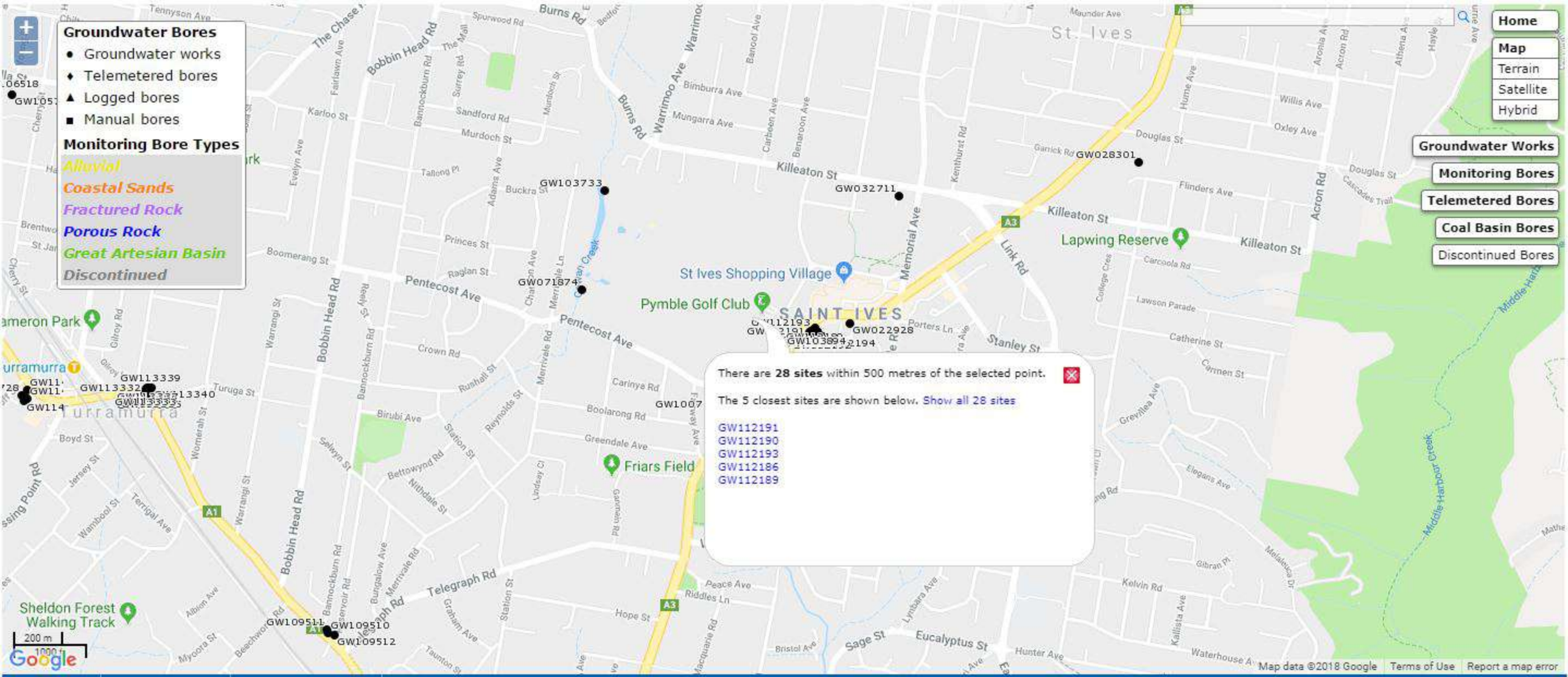
DRAWING No. A107

REV E

ISSUE	AMENDMENT DESCRIPTION	DATE
E	CLIENT REVIEW	12.02.2019
D	FOR REVIEW	22.01.2019
C	DRAFT FOR CLIENT REVIEW	16.10.2018
B	DRAFT FOR CLIENT REVIEW	10.10.2018
A	DRAFT FOR CLIENT REVIEW	08.10.2018

MAYOH

APPENDIX B
NSW Office of Water Groundwater Bore Search


Groundwater Bores
Groundwater works
Telemetered bores
Logged bores
Manual bores
Monitoring Bore Types
Alluvial
Coastal Sands
Fractured Rock
Porous Rock
Great Artesian Basin
Discontinued
Home
Map
Terrain
Satellite
Hybrid
Groundwater Works
Monitoring Bores
Telemetered Bores
Coal Basin Bores
Discontinued Bores
There are 28 sites within 500 metres of the selected point.
The 5 closest sites are shown below. Show all 28 sites
GW112191
GW112190
GW112193
GW112186
GW112189
GW103733
GW032711
GW028301
GW071874
GW022928
GW113339
GW113340
GW109511
GW109510
GW109512
St Ives Shopping Village
Pymble Golf Club
Lapwing Reserve
Friars Field
Sheldon Forest Walking Track
SAINT IVES
St. Ives
Killeaton St
Pentecost Ave
Bobbin Head Rd
Burns Rd
Telegraph Rd
Link Rd
Memorial Ave
Douglas St
Lawson Parade
Stanley St
Catherine St
Carmen St
Middle Harbour Creek
Map data ©2018 Google
Terms of Use
Report a map error
Scale = 1 : 14K
151.179, -33.725

APPENDIX C
Site Photographs

Photograph 1: The car parking facilities at the middle portion of the site (7/1/2019).

Photograph 2: Residential dwelling at the northern portion of the site (7/1/2019).

Photograph 3: Clubhouse at the south western portion of the site (7/1/2019).

Photograph 4: Bowling green area at the western portion of the site (8/1/2019).

Photograph 5: In-situ soil material encountered onsite (7/1/2019).

Photograph 6: Residential dwelling at the northern portion of the site (7/1/2019).

Photograph 7: Gravel vacant area at the rear of dwellings (7/1/2019).

APPENDIX C
Borehole Logs

TEST: BH101M

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	PIEZOMETER DETAILS ID / Static Water Level
AD/T	-	GWNE	0.0					-	ASPHALT	D		BH101M
				0.10				-	Fill: Gravelly CLAY; low plasticity, orange, with sub-angular to angular gravels, no odour.			
				0.20	BH101M_0.2-0.3 ES PID = 0.8 ppm			CL-CI	CLAY; low to medium plasticity, red, no odour.	M		
			0.5									
			1.0									
				1.20				-	SHALE; weathered rock, red, no odour.	D	-	
			1.5									
			2.0									
			2.5									
			3.0									
				3.20					Hole Terminated at 3.20 m Refusal on hard rock.			
			3.5									
			4.0									

Bentonite
50mm uPVC casing
50mm uPVC screen
Sand

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH102

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Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	ASPHALT			FILL
				0.10				-	Fill: Gravelly CLAY; low plasticity, orange, with sub-angular to angular gravels, no odour.			
					BH102_0.2-0.3 ES PID = 1.3 ppm							
			0.5	0.50				CL-CI	CLAY; low to medium plasticity, red, no odour.	M	-	NATURAL
					BH102_0.9-1.0 ES PID = 0.5 ppm							
			1.0	1.00					Hole Terminated at 1.00 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH103

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0		BH103_0.1-0.2 ES PID = 1.6 ppm			-	Fill: Gravelly CLAY; low plasticity, orange, with sub-angular to angular gravels, no odour.			FILL
				0.20				CL-CI	CLAY; low to medium plasticity, red, no odour.	M	-	NATURAL
			0.5		BH103_0.6-0.7 ES PID = 1.1 ppm							
			1.0	*1.00*					Hole Terminated at 1.00 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH104

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	Fill: Gravelly CLAY; low plasticity, orange, with sub-angular to angular gravels, no odour.			FILL
					BH104_0.2-0.3 ES PID = 1.4 ppm							
			0.5									
				0.70				CL-CI	CLAY; low to medium plasticity, red, no odour.	M	-	NATURAL
			1.0		BH104_1.2-1.3 ES PID = 1 ppm							
				1.40					Hole Terminated at 1.40 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH105

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0					-	ASPHALT			FILL
				0.10								
AD/T	-	GWNE			BH105_0.5-0.6 ES PID = 0.5 ppm			CL-CI	CLAY; low to medium plasticity, red, no odour.	D	-	NATURAL
			0.5									
				0.80								
									Hole Terminated at 0.80 m Target depth reached.			
			1.0									
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH106

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	ASPHALT	M	-	FILL
				0.10				-	Fill: Gravelly CLAY; low plasticity, orange, with sub-angular to angular gravels, no odour.			
					BH106_0.2-0.3 ES PID = 1.8 ppm							
				0.30				CL-CI	CLAY; low to medium plasticity, red, no odour.			NATURAL
			0.5		BH106_0.7-0.8 ES PID = 1.6 ppm							
				0.90					Hole Terminated at 0.90 m Target depth reached.			
			1.0									
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH107

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	ASPHALT			FILL
				0.10								
								CL-CI	CLAY; low to medium plasticity, red, no odour.	M	-	NATURAL
			0.5		BH107_0.5-0.6 ES PID = 1.1 ppm							
				0.90								
			1.0						Hole Terminated at 0.90 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH108

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	ASPHALT			FILL
				0.10	BH108_0.1-0.2 ES PID = 1.7 ppm			-	Fill: Gravelly CLAY; low plasticity, orange, with sub-angular to angular gravels, no odour.	D		
				0.40				CI-CH	CLAY; medium to high plasticity, red, no odour.			NATURAL
			0.5		BH108_0.8-0.9 ES 0.80-0.90 m					M	-	
			1.0	*1.00*					Hole Terminated at 1.00 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH109

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	ASPHALT			FILL
				0.10				-	Fill: Gravelly CLAY; low plasticity, brown, with sub-angular to angular gravels and ironstone, no odour.	D		
					BH109_0.2-0.3 ES PID = 1.3 ppm							
				0.40				CI-CH	CLAY; medium to high plasticity, red, no odour.			NATURAL
			0.5								-	
					BH109_0.7-0.8 ES PID = 1.3 ppm					M		
				1.00								
			1.0						Hole Terminated at 1.00 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH110

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	ASPHALT			FILL
				0.10				-	Fill: Gravelly CLAY; low plasticity, orange, with sub-angular to angular gravels, no odour.	D		
					BH110_0.2-0.3 ES PID = 2.1 ppm							
				0.40				CL-CI	CLAY; low to medium plasticity, red, no odour.			NATURAL
			0.5							M	-	
					BH110_0.9-1.0 ES PID = 1.8 ppm							
			1.0	1.00					Hole Terminated at 1.00 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH111

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	Topsoil: Silty CLAY; low plasticity, black, with grass and rootlets, no odour.			FILL
				0.10								
								CL-CI	CLAY; low to medium plasticity, red, no odour.	D		NATURAL
			0.5		BH111_0.5-0.6 ES PID = 1.5 ppm					M	-	
				0.80								
									Hole Terminated at 0.80 m Target depth reached.			
			1.0									
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH112

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	7/9/19
Position	Refer to Figure 2			Date Completed	7/9/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	Topsoil: Silty CLAY; low plasticity, black, with grass and rootlets, no odour.			FILL
				0.10								
					BH112_0.1-0.2 ES PID = 1.9 ppm			CL-CI	CLAY; low to medium plasticity, red, no odour.			NATURAL
			0.5							M	-	
					BH112_0.7-0.8 ES PID = 2.1 ppm							
			1.0	1.00					Hole Terminated at 1.00 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH113

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0					-	ASPHALT			FILL
				0.10								
								CL-CI	CLAY; low to medium plasticity, red, no odour.			NATURAL
AD/T	-	GWNE	0.5		BH113_0.5-0.6 ES PID = 1.6 ppm					M	-	
			1.0	1.00					Hole Terminated at 1.00 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH114

Project	Detailed Site Investigation		
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives		
Position	Refer to Figure 2		
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd
Client	Pymble Golf Club	Drill Rig	Hand Auger
		Inclination	-90°

Sheet	1 OF 1
Date Started	8/1/19
Date Completed	8/1/19
Logged SL	Date:
Checked	Date:

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0.0		BH114_0.1-0.2 ES PID = 0.9 ppm			-	Topsoil: Silty CLAY; low plasticity, black, with grass and rootlets, no odour.	D	-	FILL
				0.30					Hole Terminated at 0.30 m Refusal on pipe.			
			0.5									
			1.0									
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST: BH115M

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged	SL Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	PIEZOMETER DETAILS ID Static Water Level BH115M
AD/T	-	GWNE	0	0.30	BH115M_0.2-0.3 ES PID = 1.6 ppm			-	Topsoil: Silty CLAY; low plasticity, black, with grass and rootlets, no odour.			BH115M
			1	1.30	BH115M_0.8-0.9 ES PID = 1.7 ppm			CL-CI	CLAY; low to medium plasticity, red, no odour.			
			2	4.00				-	SHALE; weathered rock, red, no odour.	D	-	Cuttings Bentonite 50mm uPVC casing 50mm uPVC screen Sand
			3	7.30				-	SHALE; slightly weathered, grey, no odour.			
			4						Hole Terminated at 7.30 m Refusal on hard rock.			
			5									
			6									
			7									
			8									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH116

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0		BH116_0.2-0.3 ES PID = 1.4 ppm			-	Fill: Silty SAND; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour.	D		FILL/ TOPSOIL
			0.5		BH116_0.8-0.9 ES PID = 1.5 ppm							
			1.0	*1.00*				CI-CH	CLAY; medium to high plasticity, grey mottled red, no odour.		-	NATURAL
			1.5		BH116_1.4-1.5 ES PID = 0.9 ppm					M		
			2.0	*2.00*					Hole Terminated at 2.00 m Target depth reached.			
			2.5									
			3.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH117

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0		BH117_0.1-0.2 ES PID = 1.6 ppm			-	Fill: Silty SAND; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour.	D	-	FILL
			0.5									
			1.0		BH117_1.0-1.1 ES PID = 1.8 ppm							
			1.5	*1.50*				CI-CH	CLAY; medium to high plasticity, grey mottled red, no odour.	M		NATURAL
			2.0	*2.00*	BH117_1.9-2.0 ES PID = 0.4 ppm				Hole Terminated at 2.00 m Target depth reached.			
			2.5									
			3.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

TEST: BH118M

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged	SL Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	PIEZOMETER DETAILS ID Static Water Level BH118M
AD/T	-	GWNE	0					-	Fill: Silty SAND; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour.	D		BH118M
					BH118M_0.2-0.3 ES							
					PID = 1.6 ppm							
				0.50				CL-CI	CLAY; low to medium plasticity, red, no odour.			
			1		BH118_0.9-1.0 ES					M		
					PID = 1.7 ppm							
				1.50				-	SHALE; weathered rock, red, no odour.		-	
			2									Cuttings
			3									
			4									Bentonite
			5							D		50mm uPVC casing
												50mm uPVC screen
			6	6.00				-	SHALE; slightly weathered, grey, no odour.			Sand
			7									
			8	8.00					Hole Terminated at 8.00 m Refusal on hard rock.			
			9									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH119

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0		BH113_0.2-0.3 ES PID = 1.4 ppm			-	Fill: Silty SAND; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour.	D		FILL
			0.5	*0.50*				CL-CI	CLAY; low to medium plasticity, red, no odour.	M	-	NATURAL
			1.0		BH119_1.0-1.1 ES PID = 1.2 ppm							
				1.20					Hole Terminated at 1.20 m Target depth reached.			
			1.5									
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH120

eiaustralia
Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged	SL Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0		BH120_0.1-0.2 ES PID = 1.5 ppm			-	Fill: Silty SAND; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour.	D	-	FILL
			0.5									
			1.0		BH120_0.9-1.0 ES PID = 1 ppm							
					BH120_1.4-1.5 ES PID = 1.5 ppm							
			1.5	*1.50*				CL-CI	CLAY; low to medium plasticity, red, no odour.	M		NATURAL
					BH120_1.9-2.0 ES PID = 1.2 ppm							
			2.0	*2.00*					Hole Terminated at 2.00 m Target depth reached.			
			2.5									
			3.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH121

eiaustralia
Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	Pymble Golf Club 4, 12-14 Cowan Road, St Ives			Date Started	8/1/19
Position	Refer to Figure 2			Date Completed	8/1/19
Job No.	E23975.E02	Contractor	HartGeo Pty Ltd	Logged SL	Date:
Client	Pymble Golf Club	Drill Rig	Ute-mounted Drill rig	Checked	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0					-	Fill: Silty SAND; fine to medium grained, brown, with brick fragments and sub-angular to angular gravels, with rootlets, no odour.			FILL
					BH121_0.2-0.3 ES PID = 1.6 ppm							
			0.5							D		
					BH121_0.8-0.9 ES PID = 1.7 ppm						-	
			1.0	*1.00*				CL-CI	CLAY; low to medium plasticity, red, no odour.			NATURAL
										M		
					BH121_1.4-1.5 ES PID = 1.5 ppm							
			1.5	*1.50*					Hole Terminated at 1.50 m Target depth reached.			
			2.0									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

APPENDIX D
Field Data Sheets

EI Australia
Suite 6.01, 55 Miller Street
PYRMONT, NSW, 2009

ABN 33 102 449 507
E service@eiaustralia.com.au
W www.eiaustralia.com.au
T 02 9516 0722

CALIBRATION CERTIFICATE FOR PHOTO IONISATION DETECTOR

Instrument: Mini RAE 3000

Serial Number: 592-906667 - EI **PID02** ☒ **OR** 592-901345 - EI **PID03** ☐

Instrument Conditions: good

Calibration gas species: Isobutylene.

Calibration gas concentration: 100 ppm

Gas bottle number: 846344/20

This PID has been calibrated to Isobutylene gas with the span concentration displayed as 101 ppm at 100 ppm span setting (allowable range +/-10ppm from span setting).

The PID is initially zero calibrated in fresh air.

Remaining gas in bottle: 725 psi (if reading is <250 psi, notify Equipment Manager to arrange new gas bottle order)

The above detector was calibrated in accordance with manufacturer's specifications.

Signed: SM

Date: 7/1/19

Time: AM

Daily Inspection / Work Summary Card - Remediation & Validation Form

OP 005a (Rev 2)

EI Australia
Suite 6.01, 55 Miller Street
PYRMONT, NSW, 2009
ABN 42 909 129 957
E service@eiaustralia.com.au
W www.eiaustralia.com.au
T 02 9516 0722

Project Number:	E23475	Engineer Name:	SL	Page:	1 of 1
Date:	14/1/19	Time ON Site:	10:30 AM		
Travel Time:	1h+1h	Time OFF Site:	11:45 AM		
Site Address/Location:	Pymble Golf Club. 12-14 Cowan Rd, St Ives				
Climatic Conditions:	Cloudy / sunny.				

Completed Works:

→ all 3 wells are dry

→ no GW sample collected.

Comments / Issues / Conclusions / Further Testing Required / Actions to be Undertaken / Timing of Actions:

Signed by:

WATER SAMPLING FIELD SHEET

eiaustralia

Site Address:	Job Number: E23975
Client:	Date: 14-1-19
Field Staff: SL	Sampling Location ID BH118M
Well Location:	Round No:
MEDIUM ☒Groundwater ☐Surface Water	☐Stormwater ☐Other:
SAMPLING POINT INFO	
Well Installation Date:	Stickup (m): -0.1 (+ above ground - below ground)
Initial Well Depth (mbgl):	Screen Interval (mBTOC):
Previous Sampling Date:	Previous SWL (mBTOC):
PID READINGS	
PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	
PRE PURGE toc	
Total Well Depth (mbgl): 8.0	Well Head Condition:
SWL (mbtoc):	Water Column (m):
PHASE SEPARATED HYDROCARBONS (PSH)	
Depth to PSH (mbtoc):	PSH Visually Confirmed (Bailer):
PSH Thickness (mm):	
PURGE AND SAMPLE	
Sampling Method ☐Bladder ☐Peristaltic ☐Submersible ☐Other:	
Depth of Pump Inlet:	Fill Timer:
Pump Pressure Regulator (psi):	Discharge Timer:
Weather Conditions:	Cycle:
Pump on time:	Pump off time:
WATER QUALITY PARAMETERS	
Probe Make and Model:	Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour etc.)
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS:

dry well.

SIGNATURE:

WATER SAMPLING FIELD SHEET

eiaustralia

Site Address:	Pymble Golf Club	Job Number:	E23975
Client:		Date:	14-1-19.
Field Staff:	SL	Sampling Location ID	BH101M.
Well Location:		Round No:	

MEDIUM ☒Groundwater ☐Surface Water ☐Stormwater ☐Other:

SAMPLING POINT INFO

Well Installation Date:		Stickup (m):	0.0 (+ above ground - below ground)
Initial Well Depth (mbgl):		Screen Interval (mBTOC):	
Previous Sampling Date:		Previous SWL (mBTOC):	

PID READINGS

PID Headspace (ppm):		PID Background (ppm):	
PID Breathing Space (ppm):			

PRE PURGE

Total Well Depth (mbgl):	2.95m	Well Head Condition:	good
SWL (mbtoc):		Water Column (m):	

PHASE SEPARATED HYDROCARBONS (PSH)

Depth to PSH (mbtoc):		PSH Visually Confirmed (Bailer):	
PSH Thickness (mm):			

PURGE AND SAMPLE

Sampling Method ☐Bladder ☐Peristaltic ☐Submersible ☐Other:

Depth of Pump Inlet:		Fill Timer:	
Pump Pressure Regulator (psi):		Discharge Timer:	
Weather Conditions:		Cycle:	
Pump on time:		Pump off time:	

WATER QUALITY PARAMETERS

Probe Make and Model:		Bump Test Date and Time:	

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour etc.)
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS:

dry well.

SIGNATURE:

WATER SAMPLING FIELD SHEET

eiaustralia

Site Address:	Job Number: E23975
Client:	Date: 14-1-19
Field Staff: SL	Sampling Location ID BH115M
Well Location:	Round No:
MEDIUM ☑Groundwater ☐Surface Water	☐Stormwater ☐Other:
SAMPLING POINT INFO	
Well Installation Date:	Stickup (m): -0.08 (+ above ground - below ground)
Initial Well Depth (mbgl):	Screen Interval (mBTOC):
Previous Sampling Date:	Previous SWL (mBTOC):
PID READINGS	
PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	
PRE PURGE TOC	
Total Well Depth (mbtoc): 6.47	Well Head Condition: good
SWL (mbtoc): 6.37	Water Column (m):
PHASE SEPARATED HYDROCARBONS (PSH)	
Depth to PSH (mbtoc):	PSH Visually Confirmed (Bailer):
PSH Thickness (mm):	
PURGE AND SAMPLE	
Sampling Method ☐Bladder ☐Peristaltic ☐Submersible ☐Other:	
Depth of Pump Inlet:	Fill Timer:
Pump Pressure Regulator (psi):	Discharge Timer:
Weather Conditions:	Cycle:
Pump on time:	Pump off time:
WATER QUALITY PARAMETERS	
Probe Make and Model:	Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour etc.)
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS: dry well.

SIGNATURE:

APPENDIX E
Chain of Custody and Sample Receipt Forms

E-MAILED 9/1/19 @ 7:55

Sheet 1 of 4

Site: Pymble Golf Club. Project No: E23975

12-14 Cowan Road, St Ives.

Laboratory: SGS Australia, Unit 16, 33 Maddox St, Alexandria NSW 2015

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS			TCLP HM [B] / PAH
BH101_0.5-0.6	1	J, ZLB	7/1/2019	AM		X			✓													
BH102_0.2-0.3	2	↓	↓	↓		↓		✓														
↓ _0.9-1.0	3								✓													
BH103_0.1-0.2	4							✓														
↓ _0.6-0.7	5								✓													
BH104_0.2-0.3	6							✓														
↓ _1.2-1.3										✓												
BH105_0.5-0.6	7			✓					✓													
BH106_0.2-0.3	8			PM				✓														
↓ _0.7-0.8																						
BH107_0.5-0.6	9								✓													
BH108_0.1-0.2	10	↓	↓	↓		↓		✓														

Comments

HM [A]: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc

HM [B]: Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel

Dewatering Suite: pH & EC, TDS / TDU, Hardness, Total Cyanide, Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), TRH (F1, F2, F3, F4), BTEX, PAH, Total Phenol

SGS EHS Alexandria Laboratory

SE187930 COC

Received: 09 – Jan – 2019

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

Container Type:
J= solvent washed, acid rinsed, Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (Eurofins):
Print: SL	Print: Nessa
Signature:	Signature:
Date: 9/1/2019	Date: 9/1/19 2:55

Sampler's Comments: Please email results to emmanuel.woelders@eiaustralia.com.au

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Sheet 2 of 4

Site: Pymble Golf Club

12-14 Cowan Rd, St Ives

Project No: E23975

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM [B] / PAH
BH108_0.8-0.9		J, ZLB	7/1/2019	PM																		
BH109_0.2-0.3	11							✓														
↓ _0.7-0.8																						
BH110_0.2-0.3	12							✓														
↓ 0.9-1.0																						
BH111_0.5-0.6	13								✓													
BH112_0.1-0.2	14							✓														
↓ _0.7-0.8			↓	↓																		
BH113_0.5-0.6	15		8/1/2019	AM					✓													
BH114_0.1-0.2	16							✓														
BH115M_0.2-0.3	17							✓														
↓ _0.8-0.9		↓	↓	↓																		

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

Container Type:
J= solvent washed, acid rinsed, Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: SL	Print: Nessa
Signature:	Signature:
Date: 9/1/2019	Date: 9/1/19 2:55

Sampler's Comments:

See 1st Page.

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Sheet 3 of 4

Site: Pymble Golf Club
12-14 Cowan Rd, St Ives

Project No: E23975

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM [B] / PAH
BH116_0.2-0.3	18	J ZLB	8/1/2019	PM		X		✓														
↓ _0.8-0.9	19	↓	↓	↓		↓		✓														
↓ _1.4-1.5																						
BH117_0.1-0.2	20							✓														
↓ _1.0-1.1	21							✓														
↓ _1.9-2.0	22								✓													
BH118M_0.2-0.3	23							✓														
↓ _0.9-1.0																						
BH119_0.2-0.3	24							✓														
↓ _1.0-1.1	25								✓													
BH120_0.1-0.2	26							✓														
↓ _0.9-1.0		↓	↓	↓		↓																

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND
- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: SL	Print: Nessa
Signature:	Signature:
Date: 9/1/2019	Date: 9/1/19 2:55

Sampler's Comments:
See 1st Page.

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Sheet 4 of 4

Site: Pymble Golf Club, 12-14 Cowan Rd, St Ives

Project No: E23975

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM [B] / PAH
BH120_1.4-1.5	27	J,ZLB	8/1/2019	PM		X		✓															
↓ _1.9-2.0		↓	↓	↓		↓																	
BH121_0.2-0.3	28							✓															
↓ _0.8-0.9																							
↓ _1.4-1.5	29	↓	↓	↓					✓														
QD1	30	J	7/1/19	NA		↓				✓													
BH100_QR1	31	S,P,VC	7/8/1/19	↓	X					✓													
BH100_QTB1		↓	↓	↓	X																		
BH100_QTS1	32	VC	Lab Prepared			X					✓												
BH100_QTB1	33	↓	↓	↓		X					✓												

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: SL	Print: Ness
Signature:	Signature:
Date: 9/1/2019	Date: 9/1/19 2:55

Sampler's Comments: see 1st Page.

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

SAMPLE RECEIPT ADVICE

SE187930

CLIENT DETAILS

Contact	Emmanuel Woelders
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	emmanuel.woelders@eiaustralia.com.au
Project	**E23975 Pymble Golf Club St Ives**
Order Number	**E23975**
Samples	33

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 9/1/2019
Report Due	Wed 16/1/2019
SGS Reference	**SE187930**

SUBMISSION DETAILS

This is to confirm that 33 samples were received on Wednesday 9/1/2019. Results are expected to be ready by COB Wednesday 16/1/2019. Please quote SGS reference SE187930 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	32 Soil 1 Water
Date documentation received	9/1/2019	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	8.9°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

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

12 Soil and 1 Water samples have been placed on hold as no tests have been assigned for them by the client . These samples will not be processed.

SAMPLE RECEIPT ADVICE

SE187930

CLIENT DETAILS

Client EI AUSTRALIA

Project E23975 Pymble Golf Club St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Elements in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH101M_0.5-0.6	-	-	26	-	7	10	12	8
002	BH102_0.2-0.3	29	14	26	11	7	10	12	8
003	BH102_0.9-1.0	-	-	26	-	7	10	12	8
004	BH103_0.1-0.2	29	14	26	11	7	10	12	8
005	BH103_0.6-0.7	-	-	26	-	7	10	12	8
006	BH104_0.2-0.3	29	14	26	11	7	10	12	8
007	BH105_0.5-0.6	-	-	26	-	7	10	12	8
008	BH106_0.2-0.3	29	14	26	11	7	10	12	8
009	BH107_0.5-0.6	-	-	26	-	7	10	12	8
010	BH108_0.1-0.2	29	14	26	11	7	10	12	8
011	BH109_0.2-0.3	29	14	26	11	7	10	12	8
012	BH110_0.2-0.3	29	14	26	11	7	10	12	8
013	BH111_0.5-0.6	-	-	26	-	7	10	12	8
014	BH112_0.1-0.2	29	14	26	11	7	10	12	8
015	BH113_0.5-0.6	-	-	26	-	7	10	12	8
016	BH114_0.1-0.2	29	14	26	11	7	10	12	8
017	BH115_0.2-0.3	29	14	26	11	7	10	12	8
018	BH116_0.2-0.3	29	14	26	11	7	10	12	8
019	BH116_0.8-0.9	29	14	26	11	7	10	12	8
020	BH117_0.1-0.2	29	14	26	11	7	10	12	8
021	BH117_1.0-1.1	29	14	26	11	7	10	12	8
022	BH117_1.9-2.0	-	-	26	-	7	10	12	8
023	BH118M_0.2-0.3	29	14	26	11	7	10	12	8
024	BH119_0.2-0.3	29	14	26	11	7	10	12	8

CONTINUED OVERLEAF

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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

SE187930

CLIENT DETAILS

Client EI AUSTRALIA

Project E23975 Pymble Golf Club St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Elements in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
025	BH119_1.0-1.1	-	-	26	-	7	10	12	8
026	BH120_0.1-0.2	29	14	26	11	7	10	12	8
027	BH120_1.4-1.5	29	14	26	11	7	10	12	8
028	BH121_0.2-0.3	29	14	26	11	7	10	12	8
029	BH121_1.4-1.5	-	-	26	-	7	10	12	8
030	QD1	-	-	-	-	7	10	12	8
032	BH100_QTS1	-	-	-	-	-	-	12	-
033	BH100_QTB1	-	-	-	-	-	-	12	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
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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

SE187930

CLIENT DETAILS

Client EI AUSTRALIA

Project E23975 Pymble Golf Club St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content
001	BH101M_0.5-0.6	-	1	1
002	BH102_0.2-0.3	2	1	1
003	BH102_0.9-1.0	-	1	1
004	BH103_0.1-0.2	2	1	1
005	BH103_0.6-0.7	-	1	1
006	BH104_0.2-0.3	2	1	1
007	BH105_0.5-0.6	-	1	1
008	BH106_0.2-0.3	2	1	1
009	BH107_0.5-0.6	-	1	1
010	BH108_0.1-0.2	2	1	1
011	BH109_0.2-0.3	2	1	1
012	BH110_0.2-0.3	2	1	1
013	BH111_0.5-0.6	-	1	1
014	BH112_0.1-0.2	2	1	1
015	BH113_0.5-0.6	-	1	1
016	BH114_0.1-0.2	2	1	1
017	BH115_0.2-0.3	2	1	1
018	BH116_0.2-0.3	2	1	1
019	BH116_0.8-0.9	2	1	1
020	BH117_0.1-0.2	2	1	1
021	BH117_1.0-1.1	2	1	1
022	BH117_1.9-2.0	-	1	1
023	BH118M_0.2-0.3	2	1	1
024	BH119_0.2-0.3	2	1	1

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE187930

CLIENT DETAILS

Client EI AUSTRALIA

Project E23975 Pymble Golf Club St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
025	BH119_1.0-1.1	-	1	1	-	-
026	BH120_0.1-0.2	2	1	1	-	-
027	BH120_1.4-1.5	2	1	1	-	-
028	BH121_0.2-0.3	2	1	1	-	-
029	BH121_1.4-1.5	-	1	1	-	-
030	QD1	-	1	1	-	-
031	BH100_QR1	-	-	-	12	8
033	BH100_QTB1	-	-	1	-	-

CONTINUED OVERLEAF

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Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE187930

CLIENT DETAILS

Client EI AUSTRALIA

Project E23975 Pymble Golf Club St Ives

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water
031	BH100_QR1	1	7	10

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
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Testing as per this table shall commence immediately unless the client intervenes with a correction .

Yin, Emily (Sydney)

From: Crawford, Huong (Sydney)
Sent: Wednesday, 30 January 2019 3:23 PM
To: 'Emmanuel Woelders - ElAustralia'; AU.SampleReceipt.Sydney (Sydney)
Cc: Harley, Paul (Sydney); Sharon Li - ElAustralia; Nathan Foster - ElAustralia
Subject: RE: Report Job SE187930, your reference E23975 Pymble Golf Club St Ives, order number E23975

Hi Emmanuel,

As discussed, we are sending the two samples to Melbourne today for methyl mercury analysis.

Cost= $280/sample.

TAT= please expect 4-5 days.

Any issues please let me know, thanks.

Kind Regards,

Huong Crawford
Environment, Health & Safety
Production Manager
SGS Australia Pty Ltd
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Phone: +61 (0)2 8594 0403
Fax: + 61 (0)2 8594 0499
E-mail: Huong.Crawford@sgs.com
Web: www.au.sgs.com
View Your Results Online: engage.sgs.com

-----Original Message-----
From: Emmanuel Woelders - ElAustralia [mailto:emmanuel.woelders@eiaustralia.com.au]
Sent: Tuesday, 29 January 2019 9:40 AM
To: AU.SampleReceipt.Sydney (Sydney) <AU.SampleReceipt.Sydney@sgs.com>
Cc: Crawford, Huong (Sydney) <Huong.Crawford@sgs.com>; Harley, Paul (Sydney) <Paul.Harley@sgs.com>; Sharon Li - ElAustralia <sharon.li@eiaustralia.com.au>; Nathan Foster - ElAustralia <nathan.foster@eiaustralia.com.au>
Subject: FW: Report Job SE187930, your reference E23975 Pymble Golf Club St Ives, order number E23975

Hi Huong,

Can you please test for methyl mercury on sample BH119_0.2-0.3 and sample BH121_0.2-0.3 on a ASAP tat. Please confirm an ETA.

Kind regards,

Emmanuel Woelders | Environmental Scientist – Project Manager

T: 02 9516 0722 T: 0499 594 989

SAMPLE RECEIPT ADVICE

SE187930A

CLIENT DETAILS

Contact	Emmanuel Woelders
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	emmanuel.woelders@eiaustralia.com.au
Project	**E23975 Pymble Golf Club St Ives-Add**
Order Number	**E23975**
Samples	33

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	Tue 29/1/2019
Report Due	Wed 6/2/2019
SGS Reference	**SE187930A**

SUBMISSION DETAILS

This is to confirm that 33 samples were received on Tuesday 29/1/2019. Results are expected to be ready by COB Wednesday 6/2/2019.
Please quote SGS reference SE187930A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	2 Soil
Date documentation received	29/1/19@9:40am	Type of documentation received	Email
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	8.9°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

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

Analysis subcontracted to SGS Melbourne, 10/585 Blackburn Road, Notting Hill, VIC, NATA Accreditation Numbe. 2562/14420.

SAMPLE RECEIPT ADVICE

SE187930A

CLIENT DETAILS

Client EI AUSTRALIA

Project E23975 Pymble Golf Club St Ives-Add

SUMMARY OF ANALYSIS

No.	Sample ID	Sample Subcontracted
024	BH119_0.2-0.3	1

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
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SAMPLE RECEIPT ADVICE

SE187930A

CLIENT DETAILS

Client EI AUSTRALIA

Project E23975 Pymble Golf Club St Ives-Add

SUMMARY OF ANALYSIS

No.	Sample ID	Sample Subcontracted
028	BH121_0.2-0.3	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 .

Sheet 1 of 1

Site: Pymble Golf Club
12-14 Cowan Rd, St Ives

Project No: E23975

Laboratory: **Envirolab Services**
12 Ashley Street,
CHATSWOOD NSW 2067
P: 02 9910 6200

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)
QT1	(1)	J	7/1/2019			X	

Analysis

HM[A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM[A] /TRH/BTEX/PAHs	HM[A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM[B] / PAH
		✓													

ENVIROLAB — Envirolab Services, 12 Ashley St, Chatswood NSW 2067, Ph: (02) 9910 6200

Job No: 209189

Date Received: 9-1-2019

Time Received: 16.42

Received By: PL

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Comments

HM[A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM[B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (Envirolab)
Print: SL	Print: Ray
Signature: Shri	Signature:
Date: 9/1/2019	Date: 9.1.2019

Sampler's Comments:
Please email results to emmanuel.woeldes@eiaustralia.com.au -

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	EI Australia
Attention	Lab Email, Emmanuel Woelders

Sample Login Details

Your reference	E23975, St Ives
Envirolab Reference	209189
Date Sample Received	09/01/2019
Date Instructions Received	09/01/2019
Date Results Expected to be Reported	16/01/2019

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10.2
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	Acid Extractable metalsin soil
QT1	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.

APPENDIX F
Laboratory Analytical Reports

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Emmanuel Woelders
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	emmanuel.woelders@eiaustralia.com.au
Project	**E23975 Pymble Golf Club St Ives**
Order Number	**E23975**
Samples	33

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	**SE187930 R0**
Date Received	9/1/2019
Date Reported	16/1/2019

COMMENTS

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

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

Asbestos analysed by Approved Identifier Yusuf Kuthpudin .

SIGNATORIES

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

Teresa Nguyen
Organic Chemist

VOC's in Soil [AN433] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH101M_0.5-0.6 SOIL - 7/1/2019 SE187930.001	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH102_0.9-1.0 SOIL - 7/1/2019 SE187930.003	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH103_0.6-0.7 SOIL - 7/1/2019 SE187930.005
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	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH105_0.5-0.6 SOIL - 7/1/2019 SE187930.007	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH107_0.5-0.6 SOIL - 7/1/2019 SE187930.009	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
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	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH111_0.5-0.6 SOIL - 7/1/2019 SE187930.013	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH113_0.5-0.6 SOIL - 8/1/2019 SE187930.015
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	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020
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

VOC's in Soil [AN433] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH117_1.9-2.0 SOIL - 8/1/2019 SE187930.022	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH119_1.0-1.1 SOIL - 8/1/2019 SE187930.025
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	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028	BH121_1.4-1.5 SOIL - 8/1/2019 SE187930.029	QD1 SOIL - 7/1/2019 SE187930.030
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	BH100_QTS1 SOIL - 8/1/2019 SE187930.032	BH100_QTB1 SOIL - 8/1/2019 SE187930.033
Benzene	mg/kg	0.1	[97%]	<0.1
Toluene	mg/kg	0.1	[95%]	<0.1
Ethylbenzene	mg/kg	0.1	[107%]	<0.1
m/p-xylene	mg/kg	0.2	[108%]	<0.2
o-xylene	mg/kg	0.1	[109%]	<0.1
Total Xylenes	mg/kg	0.3	-	<0.3
Total BTEX	mg/kg	0.6	-	<0.6
Naphthalene	mg/kg	0.1	-	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH101M_0.5-0.6 SOIL - 7/1/2019 SE187930.001	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH102_0.9-1.0 SOIL - 7/1/2019 SE187930.003	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH103_0.6-0.7 SOIL - 7/1/2019 SE187930.005
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	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH105_0.5-0.6 SOIL - 7/1/2019 SE187930.007	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH107_0.5-0.6 SOIL - 7/1/2019 SE187930.009	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
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	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH111_0.5-0.6 SOIL - 7/1/2019 SE187930.013	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH113_0.5-0.6 SOIL - 8/1/2019 SE187930.015
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	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020
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	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH117_1.9-2.0 SOIL - 8/1/2019 SE187930.022	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH119_1.0-1.1 SOIL - 8/1/2019 SE187930.025
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	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028	BH121_1.4-1.5 SOIL - 8/1/2019 SE187930.029	QD1 SOIL - 7/1/2019 SE187930.030
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

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH101M_0.5-0.6 SOIL - 7/1/2019 SE187930.001	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH102_0.9-1.0 SOIL - 7/1/2019 SE187930.003	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH103_0.6-0.7 SOIL - 7/1/2019 SE187930.005
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	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	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 (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH105_0.5-0.6 SOIL - 7/1/2019 SE187930.007	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH107_0.5-0.6 SOIL - 7/1/2019 SE187930.009	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	**51**	<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	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	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 (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH111_0.5-0.6 SOIL - 7/1/2019 SE187930.013	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH113_0.5-0.6 SOIL - 8/1/2019 SE187930.015
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	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	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 (F bands)	mg/kg	210	<210	<210	<210	<210	<210

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020
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	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	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 (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH117_1.9-2.0 SOIL - 8/1/2019 SE187930.022	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH119_1.0-1.1 SOIL - 8/1/2019 SE187930.025
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	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	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 (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028	BH121_1.4-1.5 SOIL - 8/1/2019 SE187930.029	QD1 SOIL - 7/1/2019 SE187930.030
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	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	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 (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH101M_0.5-0.6 SOIL - 7/1/2019 SE187930.001	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH102_0.9-1.0 SOIL - 7/1/2019 SE187930.003	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH103_0.6-0.7 SOIL - 7/1/2019 SE187930.005
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	**0.2**
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	**0.5**
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	**0.5**
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	**0.2**
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	**0.2**
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	**0.3**
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	**0.2**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	**0.2**
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	**0.2**
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	**0.3**
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	**0.4**
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	**0.4**
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	**2.6**
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	**2.6**

PARAMETER	UOM	LOR	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH105_0.5-0.6 SOIL - 7/1/2019 SE187930.007	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH107_0.5-0.6 SOIL - 7/1/2019 SE187930.009	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
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 (mg/kg)	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

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH111_0.5-0.6 SOIL - 7/1/2019 SE187930.013	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH113_0.5-0.6 SOIL - 8/1/2019 SE187930.015
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	**0.2**	<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	**0.3**	<0.1
Pyrene	mg/kg	0.1	<0.1	**0.1**	<0.1	**0.3**	<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 (mg/kg)	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	**1.6**	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	**1.6**	<0.8

PARAMETER	UOM	LOR	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020
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 (mg/kg)	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

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH117_1.9-2.0 SOIL - 8/1/2019 SE187930.022	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH119_1.0-1.1 SOIL - 8/1/2019 SE187930.025
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 (mg/kg)	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	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028	BH121_1.4-1.5 SOIL - 8/1/2019 SE187930.029
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1
Pyrene	mg/kg	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
Chrysene	mg/kg	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
Benzo(k)fluoranthene	mg/kg	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
Indeno(1,2,3-cd)pyrene	mg/kg	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
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	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
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	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
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8

OC Pesticides in Soil [AN420] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
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
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017
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
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023
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
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	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
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	**0.4**
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	**0.3**
Endrin	mg/kg	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
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	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
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	**0.1**
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1

OP Pesticides in Soil [AN420] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
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
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017
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
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023
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
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

OP Pesticides in Soil [AN420] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	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
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	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
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7

PCBs in Soil [AN420] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PCBs in Soil [AN420] Tested: 11/1/2019 (continued)

PARAMETER	UOM	LOR	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH101M_0.5-0.6 SOIL - 7/1/2019 SE187930.001	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH102_0.9-1.0 SOIL - 7/1/2019 SE187930.003	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH103_0.6-0.7 SOIL - 7/1/2019 SE187930.005
Arsenic, As	mg/kg	1	6	7	8	6	7
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	1.1
Chromium, Cr	mg/kg	0.3	68	21	30	35	27
Copper, Cu	mg/kg	0.5	1.2	11	0.5	1.0	59
Lead, Pb	mg/kg	1	8	64	10	13	110
Nickel, Ni	mg/kg	0.5	2.6	2.9	<0.5	0.5	3.2
Zinc, Zn	mg/kg	2	8.1	47	5.0	9.9	99

PARAMETER	UOM	LOR	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH105_0.5-0.6 SOIL - 7/1/2019 SE187930.007	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH107_0.5-0.6 SOIL - 7/1/2019 SE187930.009	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
Arsenic, As	mg/kg	1	4	6	7	7	5
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	42	57	26	53	30
Copper, Cu	mg/kg	0.5	33	1.1	2.2	1.1	2.4
Lead, Pb	mg/kg	1	41	8	19	12	12
Nickel, Ni	mg/kg	0.5	33	2.2	1.4	1.4	1.4
Zinc, Zn	mg/kg	2	50	7.4	8.3	19	6.9

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH111_0.5-0.6 SOIL - 7/1/2019 SE187930.013	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH113_0.5-0.6 SOIL - 8/1/2019 SE187930.015
Arsenic, As	mg/kg	1	7	7	4	7	6
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	36	44	61	34	24
Copper, Cu	mg/kg	0.5	2.8	5.3	2.1	15	0.8
Lead, Pb	mg/kg	1	28	21	9	100	14
Nickel, Ni	mg/kg	0.5	4.9	3.3	2.4	3.1	0.6
Zinc, Zn	mg/kg	2	15	20	8.6	63	7.2

PARAMETER	UOM	LOR	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020
Arsenic, As	mg/kg	1	32	17	4	7	11
Cadmium, Cd	mg/kg	0.3	0.5	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	18	12	2.5	3.8	5.8
Copper, Cu	mg/kg	0.5	12	9.3	2.4	6.8	8.6
Lead, Pb	mg/kg	1	41	18	4	12	9
Nickel, Ni	mg/kg	0.5	2.3	1.6	1.3	1.1	0.8
Zinc, Zn	mg/kg	2	70	31	7.1	20	9.8

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 11/1/2019

(continued)

PARAMETER	UOM	LOR	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH117_1.9-2.0 SOIL - 8/1/2019 SE187930.022	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH119_1.0-1.1 SOIL - 8/1/2019 SE187930.025
Arsenic, As	mg/kg	1	9	7	8	130	6
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	1.9	<0.3
Chromium, Cr	mg/kg	0.3	5.4	6.0	14	17	4.7
Copper, Cu	mg/kg	0.5	11	4.1	5.0	5.3	6.8
Lead, Pb	mg/kg	1	9	7	24	340	5
Nickel, Ni	mg/kg	0.5	0.9	<0.5	2.7	1.4	<0.5
Zinc, Zn	mg/kg	2	10	3.2	100	33	2.8

PARAMETER	UOM	LOR	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028	BH121_1.4-1.5 SOIL - 8/1/2019 SE187930.029	QD1 SOIL - 7/1/2019 SE187930.030
Arsenic, As	mg/kg	1	32	27	21	5	4
Cadmium, Cd	mg/kg	0.3	0.6	<0.3	0.9	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	11	16	14	9.7	17
Copper, Cu	mg/kg	0.5	7.1	2.9	12	6.5	39
Lead, Pb	mg/kg	1	44	14	69	11	41
Nickel, Ni	mg/kg	0.5	3.2	2.2	3.1	<0.5	20
Zinc, Zn	mg/kg	2	63	8.1	35	3.1	42

Mercury in Soil [AN312] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH101M_0.5-0.6 SOIL - 7/1/2019 SE187930.001	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH102_0.9-1.0 SOIL - 7/1/2019 SE187930.003	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH103_0.6-0.7 SOIL - 7/1/2019 SE187930.005
Mercury	mg/kg	0.05	0.07	0.13	<0.05	<0.05	0.54

PARAMETER	UOM	LOR	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH105_0.5-0.6 SOIL - 7/1/2019 SE187930.007	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH107_0.5-0.6 SOIL - 7/1/2019 SE187930.009	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
Mercury	mg/kg	0.05	0.11	<0.05	<0.05	0.06	<0.05

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH111_0.5-0.6 SOIL - 7/1/2019 SE187930.013	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH113_0.5-0.6 SOIL - 8/1/2019 SE187930.015
Mercury	mg/kg	0.05	<0.05	0.09	0.07	0.19	<0.05

PARAMETER	UOM	LOR	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020
Mercury	mg/kg	0.05	0.59	0.16	<0.05	0.59	0.16

PARAMETER	UOM	LOR	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH117_1.9-2.0 SOIL - 8/1/2019 SE187930.022	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH119_1.0-1.1 SOIL - 8/1/2019 SE187930.025
Mercury	mg/kg	0.05	<0.05	<0.05	2.4	31	0.35

PARAMETER	UOM	LOR	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028	BH121_1.4-1.5 SOIL - 8/1/2019 SE187930.029	QD1 SOIL - 7/1/2019 SE187930.030
Mercury	mg/kg	0.05	4.2	<0.05	14	<0.05	<0.05

Moisture Content [AN002] Tested: 11/1/2019

PARAMETER	UOM	LOR	BH101M_0.5-0.6 SOIL - 7/1/2019 SE187930.001	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH102_0.9-1.0 SOIL - 7/1/2019 SE187930.003	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH103_0.6-0.7 SOIL - 7/1/2019 SE187930.005
% Moisture	%w/w	0.5	24	9.6	12	20	20

PARAMETER	UOM	LOR	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH105_0.5-0.6 SOIL - 7/1/2019 SE187930.007	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH107_0.5-0.6 SOIL - 7/1/2019 SE187930.009	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
% Moisture	%w/w	0.5	5.2	18	11	23	16

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH111_0.5-0.6 SOIL - 7/1/2019 SE187930.013	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH113_0.5-0.6 SOIL - 8/1/2019 SE187930.015
% Moisture	%w/w	0.5	18	11	24	12	15

PARAMETER	UOM	LOR	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020
% Moisture	%w/w	0.5	12	13	12	11	12

PARAMETER	UOM	LOR	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH117_1.9-2.0 SOIL - 8/1/2019 SE187930.022	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH119_1.0-1.1 SOIL - 8/1/2019 SE187930.025
% Moisture	%w/w	0.5	13	19	17	23	15

PARAMETER	UOM	LOR	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028	BH121_1.4-1.5 SOIL - 8/1/2019 SE187930.029	QD1 SOIL - 7/1/2019 SE187930.030
% Moisture	%w/w	0.5	23	22	16	19	5.5

PARAMETER	UOM	LOR	BH100_QTB1 SOIL - 8/1/2019 SE187930.033
% Moisture	%w/w	0.5	<0.5

Fibre Identification in soil [AN602] Tested: 15/1/2019

PARAMETER	UOM	LOR	BH102_0.2-0.3 SOIL - 7/1/2019 SE187930.002	BH103_0.1-0.2 SOIL - 7/1/2019 SE187930.004	BH104_0.2-0.3 SOIL - 7/1/2019 SE187930.006	BH106_0.2-0.3 SOIL - 7/1/2019 SE187930.008	BH108_0.1-0.2 SOIL - 7/1/2019 SE187930.010
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

PARAMETER	UOM	LOR	BH109_0.2-0.3 SOIL - 7/1/2019 SE187930.011	BH110_0.2-0.3 SOIL - 7/1/2019 SE187930.012	BH112_0.1-0.2 SOIL - 7/1/2019 SE187930.014	BH114_0.1-0.2 SOIL - 8/1/2019 SE187930.016	BH115_0.2-0.3 SOIL - 8/1/2019 SE187930.017
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

PARAMETER	UOM	LOR	BH116_0.2-0.3 SOIL - 8/1/2019 SE187930.018	BH116_0.8-0.9 SOIL - 8/1/2019 SE187930.019	BH117_0.1-0.2 SOIL - 8/1/2019 SE187930.020	BH117_1.0-1.1 SOIL - 8/1/2019 SE187930.021	BH118M_0.2-0.3 SOIL - 8/1/2019 SE187930.023
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

PARAMETER	UOM	LOR	BH119_0.2-0.3 SOIL - 8/1/2019 SE187930.024	BH120_0.1-0.2 SOIL - 8/1/2019 SE187930.026	BH120_1.4-1.5 SOIL - 8/1/2019 SE187930.027	BH121_0.2-0.3 SOIL - 8/1/2019 SE187930.028
Asbestos Detected	No unit	-	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01

VOCs in Water [AN433] Tested: 14/1/2019

PARAMETER	UOM	LOR	BH100_QR1 WATER - 8/1/2019 SE187930.031
Benzene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	**1.0**
Ethylbenzene	µg/L	0.5	<0.5
m/p-xylene	µg/L	1	<1
o-xylene	µg/L	0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5
Total BTEX	µg/L	3	<3
Naphthalene	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 14/1/2019

PARAMETER	UOM	LOR	BH100_QR1 WATER - 8/1/2019 SE187930.031
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 14/1/2019

PARAMETER	UOM	LOR	BH100_QR1 WATER - 8/1/2019 SE187930.031
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
TRH >C10-C16	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C36	µg/L	450	<450
TRH C10-C40	µg/L	650	<650
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 15/1/2019

PARAMETER	UOM	LOR	BH100_QR1 WATER - 8/1/2019 SE187930.031
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

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 14/1/2019

PARAMETER	UOM	LOR	BH100_QR1 WATER - 8/1/2019 SE187930.031
Mercury	mg/L	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.
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.
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 Recoverable Hydrocarbons - Silica (TRH-Si) 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) The fibres detected may or may not be asbestos fibres.
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

SE187930 R0

CLIENT DETAILS

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Project	**E23975 Pymble Golf Club St Ives**
Order Number	**E23975**
Samples	33

LABORATORY DETAILS

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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE187930 R0**
Date Received	09 Jan 2019
Date Reported	17 Jan 2019

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:

Duplicate	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	1 item
Matrix Spike	Mercury in Soil	1 item
	Mercury in Soil	1 item
	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	3 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	32 Soil 1 Water
Date documentation received	9/1/2019	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	8.9°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

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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
BH102_0.2-0.3	SE187930.002	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164637	07 Jan 2019	09 Jan 2019	07 Jan 2020	15 Jan 2019	07 Jan 2020	16 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164637	08 Jan 2019	09 Jan 2019	08 Jan 2020	15 Jan 2019	08 Jan 2020	16 Jan 2019

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
BH100_QR1	SE187930.031	LB164495	08 Jan 2019	09 Jan 2019	05 Feb 2019	14 Jan 2019	05 Feb 2019	14 Jan 2019

Mercury in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.5-0.6	SE187930.001	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164437	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164437	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164437	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164437	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164437	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164437	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164438	08 Jan 2019	09 Jan 2019	05 Feb 2019	11 Jan 2019	05 Feb 2019	15 Jan 2019
QD1	SE187930.030	LB164438	07 Jan 2019	09 Jan 2019	04 Feb 2019	11 Jan 2019	04 Feb 2019	15 Jan 2019

Moisture Content

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

Sample Name	Sample No.	QC Ref

HOLDING TIME SUMMARY

SE187930 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.

Moisture Content (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.5-0.6	SE187930.001	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164433	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164433	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164433	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164433	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164433	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164433	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
QD1	SE187930.030	LB164434	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019
BH100_QTB1	SE187930.033	LB164434	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	16 Jan 2019	15 Jan 2019

OC Pesticides in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.5-0.6	SE187930.001	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

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.

OC Pesticides in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH120_1.4-1.5	SE187930.027	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
QD1	SE187930.030	LB164432	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

OP Pesticides in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.5-0.6	SE187930.001	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
QD1	SE187930.030	LB164432	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

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
BH101M_0.5-0.6	SE187930.001	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

HOLDING TIME SUMMARY

SE187930 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 (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH117_1.9-2.0	SE187930.022	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
QD1	SE187930.030	LB164432	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

PCBs in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.5-0.6	SE187930.001	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
QD1	SE187930.030	LB164432	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

Total Recoverable Elements 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
BH101M_0.5-0.6	SE187930.001	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164435	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164435	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164435	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019

HOLDING TIME SUMMARY

SE187930 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.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH115_0.2-0.3	SE187930.017	LB164435	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164435	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164435	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164436	08 Jan 2019	09 Jan 2019	07 Jul 2019	11 Jan 2019	07 Jul 2019	15 Jan 2019
QD1	SE187930.030	LB164436	07 Jan 2019	09 Jan 2019	06 Jul 2019	11 Jan 2019	06 Jul 2019	15 Jan 2019

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
BH100_QR1	SE187930.031	LB164585	08 Jan 2019	09 Jan 2019	07 Jul 2019	15 Jan 2019	07 Jul 2019	15 Jan 2019

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
BH101M_0.5-0.6	SE187930.001	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164431	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164431	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164432	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
QD1	SE187930.030	LB164432	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

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
BH100_QR1	SE187930.031	LB164491	08 Jan 2019	09 Jan 2019	15 Jan 2019	14 Jan 2019	23 Feb 2019	16 Jan 2019

VOC's in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.5-0.6	SE187930.001	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019

HOLDING TIME SUMMARY

SE187930 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
BH102_0.9-1.0	SE187930.003	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_0.2-0.3	SE187930.024	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
QD1	SE187930.030	LB164430	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH100_QTS1	SE187930.032	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH100_QTB1	SE187930.033	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

VOCs in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH100_QR1	SE187930.031	LB164551	08 Jan 2019	09 Jan 2019	15 Jan 2019	14 Jan 2019	23 Feb 2019	16 Jan 2019

Volatile Petroleum Hydrocarbons in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101M_0.5-0.6	SE187930.001	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.2-0.3	SE187930.002	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH102_0.9-1.0	SE187930.003	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.1-0.2	SE187930.004	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH103_0.6-0.7	SE187930.005	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH104_0.2-0.3	SE187930.006	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH105_0.5-0.6	SE187930.007	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH106_0.2-0.3	SE187930.008	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH107_0.5-0.6	SE187930.009	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH108_0.1-0.2	SE187930.010	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH109_0.2-0.3	SE187930.011	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH110_0.2-0.3	SE187930.012	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH111_0.5-0.6	SE187930.013	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH112_0.1-0.2	SE187930.014	LB164428	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH113_0.5-0.6	SE187930.015	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH114_0.1-0.2	SE187930.016	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH115_0.2-0.3	SE187930.017	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.2-0.3	SE187930.018	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH116_0.8-0.9	SE187930.019	LB164428	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	15 Jan 2019
BH117_0.1-0.2	SE187930.020	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.0-1.1	SE187930.021	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH117_1.9-2.0	SE187930.022	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH118M_0.2-0.3	SE187930.023	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

HOLDING TIME SUMMARY

SE187930 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.

Volatile Petroleum Hydrocarbons in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH119_0.2-0.3	SE187930.024	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH119_1.0-1.1	SE187930.025	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_0.1-0.2	SE187930.026	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH120_1.4-1.5	SE187930.027	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_0.2-0.3	SE187930.028	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH121_1.4-1.5	SE187930.029	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
QD1	SE187930.030	LB164430	07 Jan 2019	09 Jan 2019	21 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH100_QTS1	SE187930.032	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019
BH100_QTB1	SE187930.033	LB164430	08 Jan 2019	09 Jan 2019	22 Jan 2019	11 Jan 2019	20 Feb 2019	16 Jan 2019

Volatile Petroleum Hydrocarbons in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH100_QR1	SE187930.031	LB164551	08 Jan 2019	09 Jan 2019	15 Jan 2019	14 Jan 2019	23 Feb 2019	16 Jan 2019

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]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH102_0.2-0.3	SE187930.002	%	60 - 130%	87
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	95
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	87
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	78
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	102
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	99
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	94
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	79
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	71
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	79
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	72
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	75
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	70
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	72
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	77
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	71
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	71
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	73
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	76

OP Pesticides in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH102_0.2-0.3	SE187930.002	%	60 - 130%	98
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	100
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	102
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	102
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	102
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	104
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	100
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	102
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	102
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	100
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	100
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	96
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	82
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	90
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	96
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	94
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	92
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	94
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	94
d14-p-terphenyl (Surrogate)	BH102_0.2-0.3	SE187930.002	%	60 - 130%	108
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	110
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	112
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	110
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	114
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	112
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	108
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	108
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	110
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	108
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	108
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	106
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	90
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	96
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	104
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	104
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	102
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	104
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	102

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 Soil — **Method: ME-(AU)-[ENV]AN420**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	70 - 130%	102
	BH102_0.2-0.3	SE187930.002	%	70 - 130%	98
	BH102_0.9-1.0	SE187930.003	%	70 - 130%	102
	BH103_0.1-0.2	SE187930.004	%	70 - 130%	100
	BH103_0.6-0.7	SE187930.005	%	70 - 130%	100
	BH104_0.2-0.3	SE187930.006	%	70 - 130%	102
	BH105_0.5-0.6	SE187930.007	%	70 - 130%	102
	BH106_0.2-0.3	SE187930.008	%	70 - 130%	102
	BH107_0.5-0.6	SE187930.009	%	70 - 130%	102
	BH108_0.1-0.2	SE187930.010	%	70 - 130%	102
	BH109_0.2-0.3	SE187930.011	%	70 - 130%	104
	BH110_0.2-0.3	SE187930.012	%	70 - 130%	100
	BH111_0.5-0.6	SE187930.013	%	70 - 130%	102
	BH112_0.1-0.2	SE187930.014	%	70 - 130%	102
	BH113_0.5-0.6	SE187930.015	%	70 - 130%	100
	BH114_0.1-0.2	SE187930.016	%	70 - 130%	102
	BH115_0.2-0.3	SE187930.017	%	70 - 130%	100
	BH116_0.2-0.3	SE187930.018	%	70 - 130%	100
	BH116_0.8-0.9	SE187930.019	%	70 - 130%	96
	BH117_0.1-0.2	SE187930.020	%	70 - 130%	82
	BH117_1.0-1.1	SE187930.021	%	70 - 130%	90
	BH117_1.9-2.0	SE187930.022	%	70 - 130%	96
	BH118M_0.2-0.3	SE187930.023	%	70 - 130%	96
	BH119_0.2-0.3	SE187930.024	%	70 - 130%	94
	BH119_1.0-1.1	SE187930.025	%	70 - 130%	94
	BH120_0.1-0.2	SE187930.026	%	70 - 130%	92
	BH120_1.4-1.5	SE187930.027	%	70 - 130%	94
	BH121_0.2-0.3	SE187930.028	%	70 - 130%	94
	BH121_1.4-1.5	SE187930.029	%	70 - 130%	94
d14-p-terphenyl (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	70 - 130%	110
	BH102_0.2-0.3	SE187930.002	%	70 - 130%	108
	BH102_0.9-1.0	SE187930.003	%	70 - 130%	110
	BH103_0.1-0.2	SE187930.004	%	70 - 130%	110
	BH103_0.6-0.7	SE187930.005	%	70 - 130%	108
	BH104_0.2-0.3	SE187930.006	%	70 - 130%	112
	BH105_0.5-0.6	SE187930.007	%	70 - 130%	110
	BH106_0.2-0.3	SE187930.008	%	70 - 130%	110
	BH107_0.5-0.6	SE187930.009	%	70 - 130%	110
	BH108_0.1-0.2	SE187930.010	%	70 - 130%	114
	BH109_0.2-0.3	SE187930.011	%	70 - 130%	112
	BH110_0.2-0.3	SE187930.012	%	70 - 130%	108
	BH111_0.5-0.6	SE187930.013	%	70 - 130%	110
	BH112_0.1-0.2	SE187930.014	%	70 - 130%	108
	BH113_0.5-0.6	SE187930.015	%	70 - 130%	108
	BH114_0.1-0.2	SE187930.016	%	70 - 130%	110
	BH115_0.2-0.3	SE187930.017	%	70 - 130%	108
	BH116_0.2-0.3	SE187930.018	%	70 - 130%	108
	BH116_0.8-0.9	SE187930.019	%	70 - 130%	106
	BH117_0.1-0.2	SE187930.020	%	70 - 130%	90
	BH117_1.0-1.1	SE187930.021	%	70 - 130%	96
	BH117_1.9-2.0	SE187930.022	%	70 - 130%	106
	BH118M_0.2-0.3	SE187930.023	%	70 - 130%	104
	BH119_0.2-0.3	SE187930.024	%	70 - 130%	104
	BH119_1.0-1.1	SE187930.025	%	70 - 130%	104
	BH120_0.1-0.2	SE187930.026	%	70 - 130%	102
	BH120_1.4-1.5	SE187930.027	%	70 - 130%	104
	BH121_0.2-0.3	SE187930.028	%	70 - 130%	102
	BH121_1.4-1.5	SE187930.029	%	70 - 130%	102
d5-nitrobenzene (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	70 - 130%	100
	BH102_0.2-0.3	SE187930.002	%	70 - 130%	98
	BH102_0.9-1.0	SE187930.003	%	70 - 130%	100

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 Soil (continued)

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d5-nitrobenzene (Surrogate)	BH103_0.1-0.2	SE187930.004	%	70 - 130%	100
	BH103_0.6-0.7	SE187930.005	%	70 - 130%	100
	BH104_0.2-0.3	SE187930.006	%	70 - 130%	102
	BH105_0.5-0.6	SE187930.007	%	70 - 130%	100
	BH106_0.2-0.3	SE187930.008	%	70 - 130%	100
	BH107_0.5-0.6	SE187930.009	%	70 - 130%	102
	BH108_0.1-0.2	SE187930.010	%	70 - 130%	102
	BH109_0.2-0.3	SE187930.011	%	70 - 130%	102
	BH110_0.2-0.3	SE187930.012	%	70 - 130%	102
	BH111_0.5-0.6	SE187930.013	%	70 - 130%	104
	BH112_0.1-0.2	SE187930.014	%	70 - 130%	104
	BH113_0.5-0.6	SE187930.015	%	70 - 130%	104
	BH114_0.1-0.2	SE187930.016	%	70 - 130%	106
	BH115_0.2-0.3	SE187930.017	%	70 - 130%	104
	BH116_0.2-0.3	SE187930.018	%	70 - 130%	104
	BH116_0.8-0.9	SE187930.019	%	70 - 130%	100
	BH117_0.1-0.2	SE187930.020	%	70 - 130%	84
	BH117_1.0-1.1	SE187930.021	%	70 - 130%	92
	BH117_1.9-2.0	SE187930.022	%	70 - 130%	98
	BH118M_0.2-0.3	SE187930.023	%	70 - 130%	100
	BH119_0.2-0.3	SE187930.024	%	70 - 130%	100
	BH119_1.0-1.1	SE187930.025	%	70 - 130%	98
	BH120_0.1-0.2	SE187930.026	%	70 - 130%	96
	BH120_1.4-1.5	SE187930.027	%	70 - 130%	98
	BH121_0.2-0.3	SE187930.028	%	70 - 130%	102
	BH121_1.4-1.5	SE187930.029	%	70 - 130%	98

PCBs in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH102_0.2-0.3	SE187930.002	%	60 - 130%	87
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	95
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	87
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	78
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	102
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	99
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	94
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	79
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	71
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	79
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	72
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	75
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	70
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	72
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	77
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	71
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	71
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	73
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	76

VOC's in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	85
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	82
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	83
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	77
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	77
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	85
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	86
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	78
	BH107_0.5-0.6	SE187930.009	%	60 - 130%	72
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	76
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	71

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.

VOC's in Soil (continued) — Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH110_0.2-0.3	SE187930.012	%	60 - 130%	81
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	78
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	83
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	80
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	80
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	81
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	83
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	79
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	80
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	77
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	79
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	80
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	76
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	80
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	82
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	92
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	81
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	76
	QD1	SE187930.030	%	60 - 130%	75
	BH100_QTS1	SE187930.032	%	60 - 130%	86
	BH100_QTB1	SE187930.033	%	60 - 130%	85
d4-1,2-dichloroethane (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	82
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	87
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	74
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	88
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	77
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	92
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	81
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	71
	BH107_0.5-0.6	SE187930.009	%	60 - 130%	76
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	78
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	77
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	81
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	74
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	94
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	87
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	81
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	71
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	85
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	98
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	81
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	73
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	80
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	86
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	95
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	77
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	85
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	127
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	79
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	77
	QD1	SE187930.030	%	60 - 130%	83
	BH100_QTS1	SE187930.032	%	60 - 130%	84
	BH100_QTB1	SE187930.033	%	60 - 130%	88
d8-toluene (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	78
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	90
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	88
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	96
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	78
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	83
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	79
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	87

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.

VOC's in Soil (continued)

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH107_0.5-0.6	SE187930.009	%	60 - 130%	79
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	89
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	86
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	86
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	79
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	82
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	95
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	76
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	70
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	79
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	101
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	85
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	94
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	88
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	89
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	81
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	80
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	92
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	89
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	84
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	81
	QD1	SE187930.030	%	60 - 130%	89
	BH100_QTS1	SE187930.032	%	60 - 130%	91
	BH100_QTB1	SE187930.033	%	60 - 130%	91
Dibromofluoromethane (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	72
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	84
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	76
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	90
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	74
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	81
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	75
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	76
	BH107_0.5-0.6	SE187930.009	%	60 - 130%	71
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	78
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	75
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	70
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	71
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	81
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	78
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	73
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	72
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	79
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	94
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	102
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	71
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	101
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	111
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	123
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	116
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	127
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	126
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	96
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	75
	QD1	SE187930.030	%	60 - 130%	77
	BH100_QTS1	SE187930.032	%	60 - 130%	91
	BH100_QTB1	SE187930.033	%	60 - 130%	96

VOCs in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH100_QR1	SE187930.031	%	40 - 130%	97
d4-1,2-dichloroethane (Surrogate)	BH100_QR1	SE187930.031	%	40 - 130%	108

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.

VOCs in Water (continued)

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH100_QR1	SE187930.031	%	40 - 130%	110
Dibromofluoromethane (Surrogate)	BH100_QR1	SE187930.031	%	40 - 130%	110

Volatile Petroleum Hydrocarbons in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	85
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	82
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	83
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	77
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	77
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	85
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	86
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	78
	BH107_0.5-0.6	SE187930.009	%	60 - 130%	72
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	76
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	71
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	81
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	78
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	83
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	80
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	80
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	81
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	83
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	79
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	80
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	77
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	79
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	80
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	76
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	80
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	82
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	92
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	81
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	76
	QD1	SE187930.030	%	60 - 130%	75
d4-1,2-dichloroethane (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	82
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	87
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	74
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	88
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	77
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	92
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	81
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	71
	BH107_0.5-0.6	SE187930.009	%	60 - 130%	76
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	78
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	77
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	81
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	74
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	94
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	87
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	81
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	71
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	85
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	98
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	81
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	73
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	80
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	86
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	95
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	77
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	85

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 %
d4-1,2-dichloroethane (Surrogate)	BH120_1.4-1.5	SE187930.027	%	60 - 130%	127
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	79
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	77
	QD1	SE187930.030	%	60 - 130%	83
d8-toluene (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	78
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	90
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	88
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	96
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	78
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	83
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	79
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	87
	BH107_0.5-0.6	SE187930.009	%	60 - 130%	79
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	89
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	86
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	86
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	79
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	82
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	95
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	76
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	70
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	79
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	101
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	85
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	94
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	88
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	89
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	81
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	80
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	92
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	89
	BH121_0.2-0.3	SE187930.028	%	60 - 130%	84
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	81
	QD1	SE187930.030	%	60 - 130%	89
Dibromofluoromethane (Surrogate)	BH101M_0.5-0.6	SE187930.001	%	60 - 130%	72
	BH102_0.2-0.3	SE187930.002	%	60 - 130%	84
	BH102_0.9-1.0	SE187930.003	%	60 - 130%	76
	BH103_0.1-0.2	SE187930.004	%	60 - 130%	90
	BH103_0.6-0.7	SE187930.005	%	60 - 130%	74
	BH104_0.2-0.3	SE187930.006	%	60 - 130%	81
	BH105_0.5-0.6	SE187930.007	%	60 - 130%	75
	BH106_0.2-0.3	SE187930.008	%	60 - 130%	76
	BH107_0.5-0.6	SE187930.009	%	60 - 130%	71
	BH108_0.1-0.2	SE187930.010	%	60 - 130%	78
	BH109_0.2-0.3	SE187930.011	%	60 - 130%	75
	BH110_0.2-0.3	SE187930.012	%	60 - 130%	70
	BH111_0.5-0.6	SE187930.013	%	60 - 130%	71
	BH112_0.1-0.2	SE187930.014	%	60 - 130%	81
	BH113_0.5-0.6	SE187930.015	%	60 - 130%	78
	BH114_0.1-0.2	SE187930.016	%	60 - 130%	73
	BH115_0.2-0.3	SE187930.017	%	60 - 130%	72
	BH116_0.2-0.3	SE187930.018	%	60 - 130%	79
	BH116_0.8-0.9	SE187930.019	%	60 - 130%	94
	BH117_0.1-0.2	SE187930.020	%	60 - 130%	102
	BH117_1.0-1.1	SE187930.021	%	60 - 130%	71
	BH117_1.9-2.0	SE187930.022	%	60 - 130%	101
	BH118M_0.2-0.3	SE187930.023	%	60 - 130%	111
	BH119_0.2-0.3	SE187930.024	%	60 - 130%	123
	BH119_1.0-1.1	SE187930.025	%	60 - 130%	116
	BH120_0.1-0.2	SE187930.026	%	60 - 130%	127
	BH120_1.4-1.5	SE187930.027	%	60 - 130%	126

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 %
Dibromofluoromethane (Surrogate)	BH121_0.2-0.3	SE187930.028	%	60 - 130%	96
	BH121_1.4-1.5	SE187930.029	%	60 - 130%	75
	QD1	SE187930.030	%	60 - 130%	77

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH100_QR1	SE187930.031	%	40 - 130%	97
d4-1,2-dichloroethane (Surrogate)	BH100_QR1	SE187930.031	%	60 - 130%	108
d8-toluene (Surrogate)	BH100_QR1	SE187930.031	%	40 - 130%	110
Dibromofluoromethane (Surrogate)	BH100_QR1	SE187930.031	%	40 - 130%	110

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
LB164495.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB164437.001	Mercury	mg/kg	0.05	<0.05
LB164438.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB164431.001		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)	%	-	84
LB164432.001		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)	%	-	76

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.

OP Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB164431.001		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)	%	-	98
		d14-p-terphenyl (Surrogate)	%	-	106
LB164432.001		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)	%	-	94
		d14-p-terphenyl (Surrogate)	%	-	106

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB164431.001		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)	%	-	94
		2-fluorobiphenyl (Surrogate)	%	-	98
		d14-p-terphenyl (Surrogate)	%	-	106
LB164432.001		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

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 Soil (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB164432.001		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)	%	-	94
		2-fluorobiphenyl (Surrogate)	%	-	94
		d14-p-terphenyl (Surrogate)	%	-	106

PCBs in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB164431.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	84
LB164432.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	76

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

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

Sample Number	Parameter	Units	LOR	Result
LB164435.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0
LB164436.001	Arsenic, As	mg/kg	1	1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0

Trace Metals (Dissolved) in Water by ICPMS

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

Sample Number	Parameter	Units	LOR	Result
LB164585.001	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

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.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

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

Sample Number	Parameter	Units	LOR	Result
LB164431.001	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
LB164432.001	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
LB164491.001	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

VOC's in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB164428.001	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)	%	-	92
		d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	104
		Bromofluorobenzene (Surrogate)	%	-	92
	Totals	Total BTEX	mg/kg	0.6	<0.6
LB164430.001	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)	%	-	73
		d4-1,2-dichloroethane (Surrogate)	%	-	74
		d8-toluene (Surrogate)	%	-	91
		Bromofluorobenzene (Surrogate)	%	-	79
	Totals	Total BTEX	mg/kg	0.6	<0.6

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result
LB164551.001	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)	%	-	104
		d4-1,2-dichloroethane (Surrogate)	%	-	103
		d8-toluene (Surrogate)	%	-	101
		Bromofluorobenzene (Surrogate)	%	-	92

Volatile Petroleum Hydrocarbons in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB164428.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	92
		d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	104
LB164430.001		TRH C6-C9	mg/kg	20	<20

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.

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

Sample Number		Parameter	Units	LOR	Result
LB164430.001	Surrogates	Dibromofluoromethane (Surrogate)	%	-	73
		d4-1,2-dichloroethane (Surrogate)	%	-	74
		d8-toluene (Surrogate)	%	-	91

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

Sample Number		Parameter	Units	LOR	Result
LB164551.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	104
		d4-1,2-dichloroethane (Surrogate)	%	-	103
		d8-toluene (Surrogate)	%	-	101
		Bromofluorobenzene (Surrogate)	%	-	92

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 %
SE187951.001	LB164495.014	Mercury	µg/L	0.0001	<0.00005	0.00002	200	76
SE187960.007	LB164495.017	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Mercury in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164438.023	Mercury	mg/kg	0.05	0.0175931677	0.0177264492	200	0
SE187930.010	LB164437.014	Mercury	mg/kg	0.05	<0.05	<0.05	167	0
SE187930.019	LB164437.024	Mercury	mg/kg	0.05	0.59	0.64	38	8
SE187930.029	LB164438.014	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 %
SE187926.007	LB164434.021	% Moisture	%w/w	0.5	6.21359223309	.2243186582	43	39
SE187930.010	LB164433.011	% Moisture	%w/w	0.5	16	16	36	5
SE187930.019	LB164433.021	% Moisture	%w/w	0.5	11	13	38	15
SE187930.029	LB164434.011	% Moisture	%w/w	0.5	19	17	36	11

OC Pesticides in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.002	LB164432.027		Hexachlorobenzene (HCB)	mg/kg	0.1	0	0	200	0
			Alpha BHC	mg/kg	0.1	0	0	200	0
			Lindane	mg/kg	0.1	0	0	200	0
			Heptachlor	mg/kg	0.1	0	0	200	0
			Aldrin	mg/kg	0.1	0	0	200	0
			Beta BHC	mg/kg	0.1	0	0	200	0
			Delta BHC	mg/kg	0.1	0	0	200	0
			Heptachlor epoxide	mg/kg	0.1	0	0	200	0
			o,p'-DDE	mg/kg	0.1	0	0	200	0
			Alpha Endosulfan	mg/kg	0.2	0	0	200	0
			Gamma Chlordane	mg/kg	0.1	0	0	200	0
			Alpha Chlordane	mg/kg	0.1	0	0	200	0
			trans-Nonachlor	mg/kg	0.1	0	0	200	0
			p,p'-DDE	mg/kg	0.1	0	0	200	0
			Dieldrin	mg/kg	0.2	0	0	200	0
			Endrin	mg/kg	0.2	0	0	200	0
			o,p'-DDD	mg/kg	0.1	0	0	200	0
			o,p'-DDT	mg/kg	0.1	0	0	200	0
			Beta Endosulfan	mg/kg	0.2	0	0	200	0
			p,p'-DDD	mg/kg	0.1	0	0	200	0
			p,p'-DDT	mg/kg	0.1	0	0	200	0
			Endosulfan sulphate	mg/kg	0.1	0	0	200	0
			Endrin Aldehyde	mg/kg	0.1	0	0	200	0
			Methoxychlor	mg/kg	0.1	0	0	200	0
			Endrin Ketone	mg/kg	0.1	0	0	200	0
			Isodrin	mg/kg	0.1	0	0	200	0
			Mirex	mg/kg	0.1	0	0	200	0
			Total CLP OC Pesticides	mg/kg	1	0	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.111	0.105	30	6
SE187926.007	LB164432.023		Hexachlorobenzene (HCB)	mg/kg	0.1	0	0	200	0
			Alpha BHC	mg/kg	0.1	0	0	200	0
			Lindane	mg/kg	0.1	0	0	200	0
			Heptachlor	mg/kg	0.1	0	0	200	0
			Aldrin	mg/kg	0.1	0	0	200	0
			Beta BHC	mg/kg	0.1	0	0	200	0
			Delta BHC	mg/kg	0.1	0	0	200	0
			Heptachlor epoxide	mg/kg	0.1	0	0	200	0
			o,p'-DDE	mg/kg	0.1	0	0	200	0
			Alpha Endosulfan	mg/kg	0.2	0	0	200	0
			Gamma Chlordane	mg/kg	0.1	0	0	200	0
			Alpha Chlordane	mg/kg	0.1	0	0	200	0
			trans-Nonachlor	mg/kg	0.1	0	0	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.

OC Pesticides in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164432.023		p,p'-DDE	mg/kg	0.1	0	0	200	0
			Dieldrin	mg/kg	0.2	0	0	200	0
			Endrin	mg/kg	0.2	0	0	200	0
			o,p'-DDD	mg/kg	0.1	0	0	200	0
			o,p'-DDT	mg/kg	0.1	0	0	200	0
			Beta Endosulfan	mg/kg	0.2	0	0	200	0
			p,p'-DDD	mg/kg	0.1	0	0	200	0
			p,p'-DDT	mg/kg	0.1	0	0	200	0
			Endosulfan sulphate	mg/kg	0.1	0	0	200	0
			Endrin Aldehyde	mg/kg	0.1	0	0	200	0
			Methoxychlor	mg/kg	0.1	0	0	200	0
			Endrin Ketone	mg/kg	0.1	0	0	200	0
			Isodrin	mg/kg	0.1	0	0	200	0
			Mirex	mg/kg	0.1	0	0	200	0
			Total CLP OC Pesticides	mg/kg	1	0	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.107	0.118	30	10
SE187930.014	LB164431.026		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
			Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
			Mirex	mg/kg	0.1	<0.1	<0.1	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.12	0.11	30	11

OP Pesticides in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164432.023		Dichlorvos	mg/kg	0.5	0.02	0.02	200	0
			Dimethoate	mg/kg	0.5	0	0	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	0.04	0.03	200	0
			Fenitrothion	mg/kg	0.2	0	0	200	0
			Malathion	mg/kg	0.2	0	0.01	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	0.02	0.01	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	0.02	0.04	200	0
			Bromophos Ethyl	mg/kg	0.2	0.01	0.01	200	0
			Methidathion	mg/kg	0.5	0	0	200	0
			Ethion	mg/kg	0.2	0	0	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	0	0	200	0
			Total OP Pesticides*	mg/kg	1.7	0	0	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.49	0.45	30	9

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.

OP Pesticides in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164432.023	Surrogates	d14-p-terphenyl (Surrogate)	mg/kg	-	0.52	0.47	30	10
SE187930.010	LB164431.014		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	0.6	30	0
SE187930.019	LB164431.024		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE187930.028	LB164432.025		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164432.023	Naphthalene	mg/kg	0.1	0	0	200	0
		2-methylnaphthalene	mg/kg	0.1	0	0	200	0
		1-methylnaphthalene	mg/kg	0.1	0	0	200	0
		Acenaphthylene	mg/kg	0.1	0.01	0.01	200	0
		Acenaphthene	mg/kg	0.1	0	0	200	0
		Fluorene	mg/kg	0.1	0	0	200	0
		Phenanthrene	mg/kg	0.1	0.01	0.01	200	0
		Anthracene	mg/kg	0.1	0.01	0.01	200	0
		Fluoranthene	mg/kg	0.1	0.01	0.01	200	0
		Pyrene	mg/kg	0.1	0.02	0.01	200	0
		Benzo(a)anthracene	mg/kg	0.1	0.01	0.01	200	0
		Chrysene	mg/kg	0.1	0.01	0.01	200	0
		Benzo(b&j)fluoranthene	mg/kg	0.1	0.03	0.03	200	0
		Benzo(k)fluoranthene	mg/kg	0.1	0.03	0.02	200	0
		Benzo(a)pyrene	mg/kg	0.1	0.01	0.01	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.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — **Method: ME-(AU)-[ENV]AN420**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164432.023		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.01	0.01	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	0	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0.01	0.01	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	0	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	0.242	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	0.121	0.121	175	0
			Total PAH (18)	mg/kg	0.8	0	0	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.53	0.47	30	12
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.49	0.45	30	9
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.52	0.47	30	10
SE187930.010	LB164431.014		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	0
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	0.6	30	0
SE187930.019	LB164431.024		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	4
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE187930.028	LB164432.025		Naphthalene	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.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187930.028	LB164432.025		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	0.1	0.1	101	0
			Pyrene	mg/kg	0.1	0.1	0.1	104	7
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	173	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	184	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	197	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0

PCBs in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.002	LB164432.025		Arochlor 1016	mg/kg	0.2	0	0	200	0
			Arochlor 1221	mg/kg	0.2	0	0	200	0
			Arochlor 1232	mg/kg	0.2	0	0	200	0
			Arochlor 1242	mg/kg	0.2	0	0	200	0
			Arochlor 1248	mg/kg	0.2	0	0	200	0
			Arochlor 1254	mg/kg	0.2	0	0	200	0
			Arochlor 1260	mg/kg	0.2	0	0	200	0
			Arochlor 1262	mg/kg	0.2	0	0	200	0
			Arochlor 1268	mg/kg	0.2	0	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	0	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.111	0.105	30	6
SE187926.007	LB164432.023		Arochlor 1016	mg/kg	0.2	0	0	200	0
			Arochlor 1221	mg/kg	0.2	0	0	200	0
			Arochlor 1232	mg/kg	0.2	0	0	200	0
			Arochlor 1242	mg/kg	0.2	0	0	200	0
			Arochlor 1248	mg/kg	0.2	0	0	200	0
			Arochlor 1254	mg/kg	0.2	0	0	200	0
			Arochlor 1260	mg/kg	0.2	0	0	200	0
			Arochlor 1262	mg/kg	0.2	0	0	200	0
			Arochlor 1268	mg/kg	0.2	0	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	0	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.107	0.118	30	10
SE187930.014	LB164431.026		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	11

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.

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

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164436.023	Arsenic, As	mg/kg	1	10.1386713475	9.3691151318	40	8
		Cadmium, Cd	mg/kg	0.3	0.1205329012	0.0695382122	200	0
		Chromium, Cr	mg/kg	0.3	15.8222612298	14.2924205599	33	10
		Copper, Cu	mg/kg	0.5	11.9883877936	10.5095418129	34	13
		Nickel, Ni	mg/kg	0.5	7.4915834008	6.7498424700	37	10
		Lead, Pb	mg/kg	1	23.9628679449	16.7772526780	35	35 ②
		Zinc, Zn	mg/kg	2	41.7461067602	32.5207039337	35	25
SE187930.010	LB164435.014	Arsenic, As	mg/kg	1	5	4	51	10
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	30	33	32	8
		Copper, Cu	mg/kg	0.5	2.4	3.5	47	38
		Nickel, Ni	mg/kg	0.5	1.4	1.7	62	18
		Lead, Pb	mg/kg	1	12	11	39	10
		Zinc, Zn	mg/kg	2	6.9	7.6	58	10
SE187930.019	LB164435.024	Arsenic, As	mg/kg	1	7	10	42	40
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	182	0
		Chromium, Cr	mg/kg	0.3	3.8	4.8	42	23
		Copper, Cu	mg/kg	0.5	6.8	5.2	38	27
		Nickel, Ni	mg/kg	0.5	1.1	1.3	71	20
		Lead, Pb	mg/kg	1	12	16	37	29
		Zinc, Zn	mg/kg	2	20	28	38	32
SE187930.029	LB164436.014	Arsenic, As	mg/kg	1	5	6	47	15
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	9.7	9.0	35	8
		Copper, Cu	mg/kg	0.5	6.5	6.0	38	8
		Nickel, Ni	mg/kg	0.5	<0.5	<0.5	161	0
		Lead, Pb	mg/kg	1	11	11	39	0
		Zinc, Zn	mg/kg	2	3.1	3.0	95	4

Trace Metals (Dissolved) in Water by ICPMS

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE188008.001	LB164585.013	Arsenic, As	µg/L	1	0.2738614	0.26758989	200	0
		Cadmium, Cd	µg/L	0.1	0.12155636	0.10674826	103	13
		Chromium, Cr	µg/L	1	0.0573268	0.06370259	200	0
		Copper, Cu	µg/L	1	0.16989944	0.14654145	200	0
		Lead, Pb	µg/L	1	-0.0068612	-0.01206547	200	0
		Nickel, Ni	µg/L	1	0.11788055	0.11826589	200	0
		Zinc, Zn	µg/L	5	19.80845168	19.78928279	40	0

TRH (Total Recoverable Hydrocarbons) in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187926.007	LB164432.023		TRH C10-C14	mg/kg	20	0	0	200	0
			TRH C15-C28	mg/kg	45	0	0	200	0
			TRH C29-C36	mg/kg	45	0	0	200	0
			TRH C37-C40	mg/kg	100	0	0	200	0
			TRH C10-C36 Total	mg/kg	110	0	0	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	0	0	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	0	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	0	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	0	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	0	0	200	0
SE187930.010	LB164431.014		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 (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	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
SE187930.019	LB164431.024		TRH C10-C14	mg/kg	20	<20	<20	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.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187930.019	LB164431.024		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 (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	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
SE187930.028	LB164432.025		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 (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	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

TRH (Total Recoverable Hydrocarbons) in Water

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187912.009	LB164491.023		TRH C10-C14	µg/L	50	<50	0	200	0
			TRH C15-C28	µg/L	200	<200	0	200	0
			TRH C29-C36	µg/L	200	<200	0	200	0
			TRH C37-C40	µg/L	200	<200	0	200	0
			TRH C10-C36	µg/L	450	<450	0	200	0
			TRH C10-C40	µg/L	650	<650	0	200	0
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	0	200	0
			TRH >C16-C34 (F3)	µg/L	500	<500	0	200	0
			TRH >C34-C40 (F4)	µg/L	500	<500	0	200	0

VOC's in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187930.010	LB164428.014	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	-	3.9	3.9	50	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.9	3.9	50	1
			d8-toluene (Surrogate)	mg/kg	-	4.4	4.3	50	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.9	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
SE187930.019	LB164428.024	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	-	4.7	4.6	50	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	4.9	50	1
			d8-toluene (Surrogate)	mg/kg	-	5.0	5.3	50	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.8	50	4
		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
SE187930.029	LB164430.014	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

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 %
SE187930.029	LB164430.014	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	-	3.8	3.8	50	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.9	3.9	50	0
			d8-toluene (Surrogate)	mg/kg	-	4.0	3.9	50	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.9	50	2
		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 %
SE187930.031	LB164551.026	Monocyclic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
		Aromatic	Toluene	µg/L	0.5	1.0	1.0	78	1
			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	-	5.5	4.8	30	14
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.4	4.8	30	11
			d8-toluene (Surrogate)	µg/L	-	5.5	5.2	30	4
			Bromofluorobenzene (Surrogate)	µg/L	-	4.9	5.0	30	4
SE187952.001	LB164551.022	Monocyclic	Benzene	µg/L	0.5	<0.5	0.03	200	0
		Aromatic	Toluene	µg/L	0.5	<0.5	0.09	200	0
			Ethylbenzene	µg/L	0.5	<0.5	0.02	200	0
			m/p-xylene	µg/L	1	<1	0.08	200	0
			o-xylene	µg/L	0.5	<0.5	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	0.04	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.8	4.66	30	4
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.6	4.96	30	8
			d8-toluene (Surrogate)	µg/L	-	5.2	4.94	30	5
			Bromofluorobenzene (Surrogate)	µg/L	-	5.1	4.24	30	17

Volatile Petroleum Hydrocarbons in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187930.010	LB164428.014		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	-	3.9	3.9	30	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.9	3.9	30	1
			d8-toluene (Surrogate)	mg/kg	-	4.4	4.3	30	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.9	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
SE187930.019	LB164428.024		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	-	4.7	4.6	30	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.9	4.9	30	1
			d8-toluene (Surrogate)	mg/kg	-	5.0	5.3	30	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.8	30	4
		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
SE187930.029	LB164430.014		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	-	3.8	3.8	30	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.9	3.9	30	0
			d8-toluene (Surrogate)	mg/kg	-	4.0	3.9	30	4
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.9	30	2
		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

Volatile Petroleum Hydrocarbons in Water

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

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.

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187930.031	LB164551.026		TRH C6-C10	µg/L	50	<50	<50	200	0
			TRH C6-C9	µg/L	40	<40	<40	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.5	4.8	30	14
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.4	4.8	30	11
			d8-toluene (Surrogate)	µg/L	-	5.5	5.2	30	4
			Bromofluorobenzene (Surrogate)	µg/L	-	4.9	5.0	30	4
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	200	0
SE187933.002	LB164551.023		TRH C6-C10	µg/L	50	<50	<50	200	0
			TRH C6-C9	µg/L	40	<40	<40	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.6	4.8	30	16
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.7	5.1	30	10
			d8-toluene (Surrogate)	µg/L	-	5.6	5.6	30	0
			Bromofluorobenzene (Surrogate)	µg/L	-	4.8	5.6	30	14
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	200	0
SE187952.001	LB164551.022		TRH C6-C10	µg/L	50	<50	0	200	0
			TRH C6-C9	µg/L	40	<40	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.8	4.66	30	5
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.6	4.96	30	6
			d8-toluene (Surrogate)	µg/L	-	5.2	4.94	30	13
			Bromofluorobenzene (Surrogate)	µg/L	-	5.1	4.24	30	10
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0.03	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	-0.22	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.

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164437.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	103
LB164438.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	107

OC Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164431.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	91
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	77
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	76
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	79
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	76
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	77
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.13	0.15	40 - 130	84
LB164432.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	88
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	82
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	80
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	76
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	79
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	84
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.12	0.15	40 - 130	77

OP Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164431.002		Dichlorvos	mg/kg	0.5	1.7	2	60 - 140	87
		Diazinon (Dimpylate)	mg/kg	0.5	1.9	2	60 - 140	95
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.0	2	60 - 140	98
		Ethion	mg/kg	0.2	2.0	2	60 - 140	99
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	96
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100
LB164432.002		Dichlorvos	mg/kg	0.5	1.8	2	60 - 140	92
		Diazinon (Dimpylate)	mg/kg	0.5	2.0	2	60 - 140	99
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.0	2	60 - 140	102
		Ethion	mg/kg	0.2	2.2	2	60 - 140	110
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164431.002		Naphthalene	mg/kg	0.1	4.5	4	60 - 140	113
		Acenaphthylene	mg/kg	0.1	4.7	4	60 - 140	117
		Acenaphthene	mg/kg	0.1	4.7	4	60 - 140	118
		Phenanthrene	mg/kg	0.1	4.8	4	60 - 140	120
		Anthracene	mg/kg	0.1	4.5	4	60 - 140	113
		Fluoranthene	mg/kg	0.1	4.5	4	60 - 140	113
		Pyrene	mg/kg	0.1	4.8	4	60 - 140	119
		Benzo(a)pyrene	mg/kg	0.1	4.5	4	60 - 140	112
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	98
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	96
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100
LB164432.002		Naphthalene	mg/kg	0.1	4.5	4	60 - 140	113
		Acenaphthylene	mg/kg	0.1	4.7	4	60 - 140	117
		Acenaphthene	mg/kg	0.1	4.7	4	60 - 140	116
		Phenanthrene	mg/kg	0.1	4.8	4	60 - 140	120
		Anthracene	mg/kg	0.1	4.5	4	60 - 140	113
		Fluoranthene	mg/kg	0.1	4.5	4	60 - 140	113
		Pyrene	mg/kg	0.1	4.7	4	60 - 140	119
		Benzo(a)pyrene	mg/kg	0.1	4.6	4	60 - 140	114
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100

PCBs in Soil

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

Sample Number	Parameter	Units	LOR

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.

PCBs in Soil (continued)

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164431.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	90
LB164432.002	Arochlor 1260	mg/kg	0.2	0.3	0.4	60 - 140	87

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

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164435.002	Arsenic, As	mg/kg	1	320	336.32	79 - 120	95
	Cadmium, Cd	mg/kg	0.3	420	416.6	69 - 131	101
	Chromium, Cr	mg/kg	0.3	34	35.2	80 - 120	96
	Copper, Cu	mg/kg	0.5	310	370.46	80 - 120	82
	Nickel, Ni	mg/kg	0.5	170	210.88	79 - 120	80
	Lead, Pb	mg/kg	1	89	107.87	79 - 120	82
	Zinc, Zn	mg/kg	2	270	301.27	80 - 121	89
LB164436.002	Arsenic, As	mg/kg	1	350	336.32	79 - 120	103
	Cadmium, Cd	mg/kg	0.3	400	416.6	69 - 131	97
	Chromium, Cr	mg/kg	0.3	41	35.2	80 - 120	117
	Copper, Cu	mg/kg	0.5	320	370.46	80 - 120	86
	Nickel, Ni	mg/kg	0.5	180	210.88	79 - 120	85
	Lead, Pb	mg/kg	1	91	107.87	79 - 120	84
	Zinc, Zn	mg/kg	2	280	301.27	80 - 121	94

Trace Metals (Dissolved) in Water by ICPMS

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164585.002	Arsenic, As	µg/L	1	20	20	80 - 120	98
	Cadmium, Cd	µg/L	0.1	21	20	80 - 120	103
	Chromium, Cr	µg/L	1	22	20	80 - 120	109
	Copper, Cu	µg/L	1	22	20	80 - 120	110
	Lead, Pb	µg/L	1	21	20	80 - 120	105
	Nickel, Ni	µg/L	1	22	20	80 - 120	108
	Zinc, Zn	µg/L	5	21	20	80 - 120	107

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164431.002		TRH C10-C14	mg/kg	20	44	40	60 - 140	110
		TRH C15-C28	mg/kg	45	46	40	60 - 140	115
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	93
	TRH F Bands	TRH >C10-C16	mg/kg	25	44	40	60 - 140	110
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	108
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	95
LB164432.002		TRH C10-C14	mg/kg	20	38	40	60 - 140	95
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	98
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	95
	TRH F Bands	TRH >C10-C16	mg/kg	25	39	40	60 - 140	98
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	95
		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 %
LB164491.002		TRH C10-C14	µg/L	50	990	1200	60 - 140	82
		TRH C15-C28	µg/L	200	1200	1200	60 - 140	96
		TRH C29-C36	µg/L	200	1300	1200	60 - 140	112
	TRH F Bands	TRH >C10-C16	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	670	600	60 - 140	111

VOC's in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164428.002	Monocyclic	Benzene	mg/kg	0.1	2.1	2.9	60 - 140	71
	Aromatic	Toluene	mg/kg	0.1	1.9	2.9	60 - 140	64
		Ethylbenzene	mg/kg	0.1	2.4	2.9	60 - 140	83
		m/p-xylene	mg/kg	0.2	4.9	5.8	60 - 140	85
		o-xylene	mg/kg	0.1	2.4	2.9	60 - 140	81
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.8	5	60 - 140	75

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 %
LB164428.002	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.0	5	60 - 140	80
		d8-toluene (Surrogate)	mg/kg	-	4.0	5	60 - 140	80
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	5	60 - 140	90
LB164430.002	Monocyclic	Benzene	mg/kg	0.1	2.2	2.9	60 - 140	76
	Aromatic	Toluene	mg/kg	0.1	2.2	2.9	60 - 140	77
		Ethylbenzene	mg/kg	0.1	2.3	2.9	60 - 140	79
		m/p-xylene	mg/kg	0.2	4.7	5.8	60 - 140	81
		o-xylene	mg/kg	0.1	2.3	2.9	60 - 140	79
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	5	60 - 140	84
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	5	60 - 140	92
		d8-toluene (Surrogate)	mg/kg	-	4.9	5	60 - 140	97
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	5	60 - 140	93

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164551.002	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	110
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.6	5	60 - 140	92
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.3	5	60 - 140	86
		d8-toluene (Surrogate)	µg/L	-	4.4	5	60 - 140	88
		Bromofluorobenzene (Surrogate)	µg/L	-	5.1	5	60 - 140	103

Volatile Petroleum Hydrocarbons in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164428.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	84
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	80
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.8	5	60 - 140	75
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.0	5	60 - 140	80
		d8-toluene (Surrogate)	mg/kg	-	4.0	5	60 - 140	80
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	5	60 - 140	90
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	98
LB164430.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	84
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	82
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	5	60 - 140	84
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	5	60 - 140	92
		d8-toluene (Surrogate)	mg/kg	-	4.9	5	60 - 140	97
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	5	60 - 140	93
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	96

Volatile Petroleum Hydrocarbons in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164551.002		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	-	4.9	5	60 - 140	97
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.8	5	60 - 140	96
		d8-toluene (Surrogate)	µg/L	-	4.8	5	60 - 140	97
		Bromofluorobenzene (Surrogate)	µg/L	-	5.2	5	60 - 140	103
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	640	639.67	60 - 140	101

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%
SE187930.001	LB164437.004	Mercury	mg/kg	0.05	0.21	0.07	0.2	69 ④
SE187930.020	LB164438.004	Mercury	mg/kg	0.05	0.28	0.16	0.2	62 ④

OC Pesticides in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.004	LB164431.025		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	0.2	<0.1	0.2	97
			Aldrin	mg/kg	0.1	0.2	<0.1	0.2	80
			Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	0.2	<0.1	0.2	78
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	<0.2	0.2	81
			Endrin	mg/kg	0.2	<0.2	<0.2	0.2	83
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	0.2	<0.1	0.2	82
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.13	0.14	-	85
SE187930.023	LB164432.026		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	0.2	<0.1	0.2	79
			Aldrin	mg/kg	0.1	0.2	<0.1	0.2	81
			Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	0.2	<0.1	0.2	76
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	<0.2	0.2	80
			Endrin	mg/kg	0.2	<0.2	<0.2	0.2	79
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	0.2	<0.1	0.2	75
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	<0.1	-	-

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.

OC Pesticides in Soil (continued)

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.023	LB164432.026		Mirex	mg/kg	0.1	<0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.11	0.12	-	71

OP Pesticides in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.002	LB164431.025		Dichlorvos	mg/kg	0.5	1.8	<0.5	2	90
			Dimethoate	mg/kg	0.5	<0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	1.9	<0.5	2	93
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.0	<0.2	2	99
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	<0.5	-	-
			Ethion	mg/kg	0.2	2.2	<0.2	2	107
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	7.8	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	96
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	104
SE187930.021	LB164432.024		Dichlorvos	mg/kg	0.5	1.7	<0.5	2	83
			Dimethoate	mg/kg	0.5	<0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	2.2	<0.5	2	108
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.2	<0.2	2	108
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	<0.5	-	-
			Ethion	mg/kg	0.2	2.2	<0.2	2	111
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	8.3	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	86
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	94

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.002	LB164431.025		Naphthalene	mg/kg	0.1	4.5	<0.1	4	113
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.6	<0.1	4	116
			Acenaphthene	mg/kg	0.1	4.7	<0.1	4	118
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.9	<0.1	4	121
			Anthracene	mg/kg	0.1	4.6	<0.1	4	113
			Fluoranthene	mg/kg	0.1	4.6	0.1	4	111
			Pyrene	mg/kg	0.1	4.9	<0.1	4	121
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.7	<0.1	4	115
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.7	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.8	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.7	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	37	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	-	102
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	96
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	104

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	Result	Original	Spike	Recovery%
SE187930.021	LB164432.024		Naphthalene	mg/kg	0.1	5.0	<0.1	4	124
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.5	<0.1	4	112
			Acenaphthene	mg/kg	0.1	4.7	<0.1	4	117
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	5.0	<0.1	4	124
			Anthracene	mg/kg	0.1	4.4	<0.1	4	110
			Fluoranthene	mg/kg	0.1	4.9	<0.1	4	124
			Pyrene	mg/kg	0.1	4.7	<0.1	4	118
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.6	<0.1	4	115
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.6	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.7	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.7	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	38	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	-	92
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	86
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	94

PCBs in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.004	LB164431.025		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	0.4	<0.2	0.4	101
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	-	91
SE187930.023	LB164432.024		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	0.4	<0.2	0.4	92
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	-	99

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

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.001	LB164435.004	Arsenic, As	mg/kg	1	29	6	50	46 ④
		Cadmium, Cd	mg/kg	0.3	38	<0.3	50	76
		Chromium, Cr	mg/kg	0.3	86	68	50	36 ④
		Copper, Cu	mg/kg	0.5	43	1.2	50	83
		Nickel, Ni	mg/kg	0.5	39	2.6	50	72
		Lead, Pb	mg/kg	1	43	8	50	70 ④
		Zinc, Zn	mg/kg	2	45	8.1	50	75
SE187930.020	LB164436.004	Arsenic, As	mg/kg	1	47	11	50	72
		Cadmium, Cd	mg/kg	0.3	40	<0.3	50	79

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.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.020	LB164436.004	Chromium, Cr	mg/kg	0.3	46	5.8	50	81
		Copper, Cu	mg/kg	0.5	48	8.6	50	79
		Nickel, Ni	mg/kg	0.5	40	0.8	50	78
		Lead, Pb	mg/kg	1	53	9	50	88
		Zinc, Zn	mg/kg	2	50	9.8	50	81

Trace Metals (Dissolved) in Water by ICPMS

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.031	LB164585.004	Arsenic, As	µg/L	1	20	<1	20	99
		Cadmium, Cd	µg/L	0.1	20	<0.1	20	102
		Chromium, Cr	µg/L	1	22	<1	20	108
		Copper, Cu	µg/L	1	22	<1	20	110
		Lead, Pb	µg/L	1	21	<1	20	104
		Nickel, Ni	µg/L	1	21	<1	20	107
		Zinc, Zn	µg/L	5	23	<5	20	113

TRH (Total Recoverable Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.002	LB164431.025		TRH C10-C14	mg/kg	20	44	<20	40	110
			TRH C15-C28	mg/kg	45	<45	<45	40	103
			TRH C29-C36	mg/kg	45	47	<45	40	118
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	43	<25	40	108
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	43	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	108
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-
SE187930.021	LB164432.024		TRH C10-C14	mg/kg	20	39	<20	40	98
			TRH C15-C28	mg/kg	45	<45	<45	40	98
			TRH C29-C36	mg/kg	45	<45	<45	40	103
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	40	<25	40	100
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	40	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	100
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.001	LB164428.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.1	<0.1	2.9	73
			Toluene	mg/kg	0.1	1.8	<0.1	2.9	63
			Ethylbenzene	mg/kg	0.1	2.2	<0.1	2.9	75
			m/p-xylene	mg/kg	0.2	4.1	<0.2	5.8	70
			o-xylene	mg/kg	0.1	2.0	<0.1	2.9	68
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.0	3.6	-	80
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	4.1	-	83
			d8-toluene (Surrogate)	mg/kg	-	4.2	3.9	-	84
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.0	4.3	-	80
		Totals	Total Xylenes	mg/kg	0.3	6.0	<0.3	-	-
			Total BTEX	mg/kg	0.6	12	<0.6	-	-
SE187930.020	LB164430.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.7	<0.1	2.9	92
			Toluene	mg/kg	0.1	1.9	<0.1	2.9	63
			Ethylbenzene	mg/kg	0.1	2.6	<0.1	2.9	89
			m/p-xylene	mg/kg	0.2	5.2	<0.2	5.8	90
			o-xylene	mg/kg	0.1	2.6	<0.1	2.9	90
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.9	5.1	-	117
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.9	4.1	-	118
			d8-toluene (Surrogate)	mg/kg	-	3.6	4.2	-	72

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%
SE187930.020	LB164430.004	Surrogates	Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.0	-	90
		Totals	Total Xylenes	mg/kg	0.3	7.8	<0.3	-	-
			Total BTEX	mg/kg	0.6	15	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187930.001	LB164428.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	79
			TRH C6-C9	mg/kg	20	<20	<20	23.2	75
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.0	3.6	-	80
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	4.1	-	83
			d8-toluene (Surrogate)	mg/kg	-	4.2	3.9	-	84
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.0	4.3	-	80
		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	101
SE187930.020	LB164430.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	89
			TRH C6-C9	mg/kg	20	20	<20	23.2	87
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.9	5.1	-	117
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.9	4.1	-	118
			d8-toluene (Surrogate)	mg/kg	-	3.6	4.2	-	72
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.0	-	90
		VPH F	Benzene (F0)	mg/kg	0.1	2.7	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	98

Volatile Petroleum Hydrocarbons in Water

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187951.001	LB164551.025		TRH C6-C10	µg/L	50	910	<50	946.63	96
			TRH C6-C9	µg/L	40	740	<40	818.71	90
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.4	4.4	-	88
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.6	4.4	-	92
			d8-toluene (Surrogate)	µg/L	-	5.2	4.8	-	103
			Bromofluorobenzene (Surrogate)	µg/L	-	5.6	5.0	-	112
		VPH F	Benzene (F0)	µg/L	0.5	46	<0.5	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	630	<50	639.67	98

MATRIX SPIKE DUPLICATES

SE187930 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: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	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.

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Emmanuel Woelders	Manager	Adam Atkinson
Client	EI AUSTRALIA	Laboratory	SGS Melbourne EH&S
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009	Address	10/585 Blackburn Road Notting Hill Victoria 3168
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Facsimile	(Not specified)	Facsimile	+61395743399
Email	au.environmental.sydney@sgs.com	Email	Au.SampleReceipt.Melbourne@sgs.com
Project	**E23975**	SGS Reference	**ME309514 R0**
Order Number	**SE187930A**	Date Received	01 Feb 2019
Samples	2	Date Reported	08 Feb 2019

COMMENTS

Whilst SGS laboratories conform to ISO:17025 standards, results of analysis in this report fall outside of the current scope of NATA accreditation .

SIGNATORIES

Ryan Zhang
Team Leader

Parameter	Units	LOR	Sample Number: ME309514.001 Sample Matrix: Soil Sample Date: 08 Jan 2019 Sample Name: BH119_0.2-0.3	Sample Number: ME309514.002 Sample Matrix: Soil Sample Date: 08 Jan 2018 Sample Name: BH121_0.2-0.3
Moisture Content Method: AN002 Tested: 5/2/2019				
% Moisture	%w/w	1	**19.5**	**14.8**
Organic Mercury in soil Method: MA-11400-SL-SP-ORG-HG Tested: 5/2/2019				
Methyl Mercury	mg/kg	0.01	<0.01	<0.01

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Moisture Content **Method: ME-(AU)-[ENV]AN002**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB024949	%w/w	1	14%

Organic Mercury in soil **Method: MA-11400-SL-SP-ORG-HG**

Parameter	QC Reference	Units	LOR	MB
Methyl Mercury	LB024950	mg/kg	0.01	<0.01

METHOD SUMMARY

ME309514 R0

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.
MA1400-SL-SP-ORG-HG	This method is based on USEPA 3200 for determination of organic mercury using liquid chromatography – inductively coupled plasma mass spectrometer (LC-ICPMS). For the determination of extractable methyl-mercury species, a representative sample aliquot is extracted with an appropriate volume of solvent, at an elevated temperature. Methyl-mercury species fractions are separated and determined by using an high performance liquid chromatography (HPLC) as the separation device, coupled with an Agilent ICP-MS 7500Ce as the detector.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

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 calcuated 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

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CERTIFICATE OF ANALYSIS 209189

Client Details

Client	EI Australia
Attention	Lab Email, Emmanuel Woelders
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details

Your Reference	**E23975, St Ives**
Number of Samples	1 Soil
Date samples received	09/01/2019
Date completed instructions received	09/01/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	16/01/2019
Date of Issue	14/01/2019

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Results Approved By
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals

Authorised By

Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		209189-1
Your Reference	UNITS	QT1
Date Sampled		07/01/2019
Type of sample		Soil
Date extracted	-	10/01/2019
Date analysed	-	11/01/2019
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	80

svTRH (C10-C40) in Soil		
Our Reference		209189-1
Your Reference	UNITS	QT1
Date Sampled		07/01/2019
Type of sample		Soil
Date extracted	-	10/01/2019
Date analysed	-	11/01/2019
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	81

Acid Extractable metals in soil		
Our Reference		209189-1
Your Reference	UNITS	QT1
Date Sampled		07/01/2019
Type of sample		Soil
Date prepared	-	10/01/2019
Date analysed	-	10/01/2019
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	25
Copper	mg/kg	26
Lead	mg/kg	49
Mercury	mg/kg	0.1
Nickel	mg/kg	10
Zinc	mg/kg	42

Moisture		
Our Reference		209189-1
Your Reference	UNITS	QT1
Date Sampled		07/01/2019
Type of sample		Soil
Date prepared	-	10/01/2019
Date analysed	-	11/01/2019
Moisture	%	8.6

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			10/01/2019	[NT]	[NT]	[NT]	[NT]	10/01/2019	[NT]
Date analysed	-			11/01/2019	[NT]	[NT]	[NT]	[NT]	11/01/2019	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	101	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	92	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	85	[NT]	[NT]	[NT]	[NT]	82	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			10/01/2019	[NT]	[NT]	[NT]	[NT]	10/01/2019	[NT]
Date analysed	-			10/01/2019	[NT]	[NT]	[NT]	[NT]	10/01/2019	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	130	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	130	[NT]
Surrogate o-Terphenyl	%		Org-003	88	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			10/01/2019	[NT]	[NT]	[NT]	[NT]	10/01/2019	[NT]
Date analysed	-			10/01/2019	[NT]	[NT]	[NT]	[NT]	10/01/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	108	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	102	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

APPENDIX G
QA/QC Assessment

I1 QUALITY CONTROL PROGRAM

I1.1 INTRODUCTION

For the purpose of assessing the quality of data presented in this Detailed Site Investigation, EI collected field QC samples for analysis. The primary laboratory, SGS Australia Pty Ltd (SGS) and secondary laboratory, Envirolab Services Pty Ltd (Envirolab) also prepared and analysed QC samples. Details of the field and laboratory QC samples are provided, with the allowable acceptance ranges for the data presented in **Table I-1**.

Table I-1 Sampling Data Quality Indicators

QA/QC Measures	Data Quality Indicators
Precision – A quantitative measure of the variability (or reproducibility) of data	Data precision would be assessed by reviewing the performance of blind field duplicate sample sets, through calculation of relative percentage differences (RPD). Data precision would be deemed acceptable if RPDs are found to be less than 30%. RPDs that exceed this range may be considered acceptable where: • Results are less than 10 times the limits of reporting (LOR); • Results are less than 20 times the LOR and the RPD is less than 50%; or • Heterogeneous materials or volatile compounds are encountered.
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	Data accuracy would be assessed through the analysis of: • Method blanks, which are analysed for the analytes targeted in the primary samples; • Matrix spike and matrix spike duplicate sample sets; • Laboratory control samples; and • Calibration of instruments against known standards.
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	To ensure the data produced by the laboratory is representative of conditions encountered in the field, the laboratory would carry out the following: • Blank samples will be run in parallel with field samples to confirm there are no unacceptable instances of laboratory artefacts; • Review of relative percentage differences (RPD) values for field and laboratory duplicates to provide an indication that the samples are generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities; and • The appropriateness of collection methodologies, handling, storage and preservation techniques will be assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods).
Completeness – A measure of the amount of useable data from a data collection activity	Analytical data sets acquired during the assessment will be evaluated as complete, upon confirmation that: • Standard operating procedures (SOPs) for sampling protocols were adhered to; and • Copies of all COC documentation are presented, reviewed and found to be properly completed. It can therefore be considered whether the proportion of "useable data" generated in the data collection activities is sufficient for the purposes of the land use assessment.

QA/QC Measures	Data Quality Indicators
Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Given that a reported data set can comprise several data sets from separate sampling episodes, issues of comparability between data sets are reduced through adherence to SOPs and regulator-endorsed or published guidelines and standards on each data gathering activity. In addition the data will be collected by experienced samplers and NATA-accredited laboratory methodologies will be employed in all laboratory testing programs.

I1.2 CALCULATION OF RELATIVE PERCENTAGE DIFFERENCE (RPD)

The RPD values were calculated using the following equation:

$$RPD = \frac{|C_O - C_R|}{[(C_O + C_R)/2]} \times 100$$

Where:

C_O = Concentration obtained for the primary sample; and

C_R = Concentration obtained for the blind replicate or split duplicate sample.

I2 FIELD QA/QC DATA EVALUATION

The field quality assurance/quality control (QA/QC) samples collected during the soil investigation works were as follows:

- One blind field duplicates (soil);
- One inter-laboratory duplicate (soil);
- One trip blank (soil); and
- One trip spikes (soil); and

Analytical results for tested soil QA/QC samples, including the calculated RPD values between primary and duplicate samples, are presented in **Table 3 (I3)**.

I2.1 SOIL INVESTIGATION

I2.1.1 Blind Field Duplicate

Sample QD1 was collected as a blind field duplicate (BFD) of the primary sample BH102_0.2-0.3 on 7 January 2019. The preparation of the BFD sample involved the collection of a bulk quantity of soil from the same sampling point without mixing, before dividing the material into identical sampling vessels. The duplicate sample was then presented blind to the primary laboratory (SGS) to avoid any potential analytical bias. The BFD soil sample was analysed for TRHs, BTEX, selected heavy metals.

Calculated RPD values were found to be within the Data Acceptance Criteria with the exceptions of arsenic (54.55%), copper (112%), mercury (103.23%) and nickel (149.34%) for BH102_0.2-0.3 (**Table I3**). These results were considered to reflect the non-homogenous nature of the fill material.

I2.1.2 Inter-Laboratory Duplicate

Sample QT1 was collected as an inter-laboratory duplicate (ILD) of the primary sample BH102_0.2-0.3 on 7 January 2019. The preparation of the ILD sample was identical to the BFD sample, as described above, and was analysed for TRHs, BTEX, and selected heavy metals.

The calculated RPD values were within the Data Acceptance Criteria, with the exception of copper (81.08%) and nickel (110.08%).The exceedances can be noted to occur between the sample and triplicate sample (QT1) which can be attributed to material heterogeneity.

Analytical results indicated that the samples collected were representative of the soils present at respective sampling locations.

I2.1.3 Trip Blank

One soil trip blank (BH100_QTB1) sample was prepared and analysed by the primary laboratory (SGS) for BTEX. Analytical results for this sample were below the laboratory LOR, indicating that satisfactory sample transport and handling conditions were achieved.

I2.1.4 Trip Spike

One soil trip spike (BH100_QTS1) sample was submitted to the primary laboratory for BTEX analysis, the results for which were reported within the RPD acceptance levels for trip spike recovery. It was therefore concluded that satisfactory sample transport and handling conditions were achieved.

I2.2 ASSESSMENT OF FIELD QA/QC DATA

All samples were classified in the field with respect to soil/fill characteristics and any observable signs of contamination based on visual and odour assessment, in regards to soil and groundwater.

All samples, including field QC samples, were transported to the primary and secondary laboratories under strict Chain-of-Custody conditions and appropriate copies of relevant documentation were included in the respective reports.

The overall completeness of documentation produced under the field program of the subject assessment was considered to be adequate for the purposes of drawing valid conclusions regarding the environmental condition of the site.

Based on the results of the field QA/QC data, EI considered the field QA/QC programme carried out during the investigation works to be appropriate and the results to be acceptable.

I3 LABORATORY QA/QC

I3.1 LABORATORY ACCREDITATION

To undertake all analytical testing, EI commissioned SGS as the primary laboratory and Envirolab as the secondary laboratory. SGS and Envirolab, both established analytical laboratories which operate in accordance with the guidelines set out in ISO/IEC Guide 25 “General requirements for the competence of calibration and testing laboratories”, conducted all respective analyses using National Association Testing Authorities (NATA)-registered procedures.

In relation to contingencies, should the pre-determined DQOs not be achieved, in accordance with each laboratory's QC policy (**Appendix H)**, respective tests are accordingly repeated. Should the results again fall outside the DQOs, then sample heterogeneity may be assumed and written comment will be provided to this effect on the final laboratory certificate. The laboratory QA/QC reports are included in **Appendix J**.

I3.2 SAMPLE HOLDING TIMES

All sample holding times were within standard environmental protocols as tabulated in **Appendix J**.

I3.3 TEST METHODS AND PRACTICAL QUANTITATION LIMITS (PQLS)

Practical Quantitation Limits for the tested parameters during the assessments of soils are presented in **Appendix J**.

7I3.4 METHOD BLANKS

Concentrations of all parameters in method blanks during the assessment were below the laboratory PQLs and were therefore within the DAC.

I3.5 LABORATORY DUPLICATE SAMPLES

The RPD values of Laboratory Duplicate Samples (LDS) for the analysis batches were all within acceptable ranges and conformed to the DAC.

I3.6 LABORATORY CONTROL SAMPLES

The Laboratory Control Samples (LCS) for the analysis batches were within acceptable ranges and conformed to the DAC.

I3.7 MATRIX SPIKES

The matrix spikes of the analysis batches were within acceptable ranges and conformed to the DAC, with the exception of some mercury, arsenic, chromium and lead due to matrix interference.

I3.8 CONCLUDING REMARK

Based on the laboratory QA/QC results, EI considers that although a small number of discrepancies were identified, the data generally confirms that the analytical results for soil laboratory testing were valid and useable for interpretation purposes.

Table I3 **Soil RPD values** **E23975 - St Ives**

Sample identification	Description	Date	TRH				BTEX				Heavy Metals							
			F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Xylene (total)	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc
Intra-laboratory Duplicate - Soil Investigation																		
BH102_0.2-0.3	Site Investigation	7/01/2019	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	7	<0.3	21	11	64	0.13	2.9	47
QD1	BFD of BH102_0.2-0.3		<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	4	<0.3	17	39	41	<0.05	20	42
RPD		-	*0.00*	*0.00*	*NA*	*NA*	*0.00*	*0.00*	*0.00*	*0.00*	**54.55**	*0.00*	*21.05*	**112.00**	*43.81*	**103.23**	**149.34**	*11.24*
Inter-laboratory Duplicate - Soil Investigation																		
BH102_0.2-0.3	Site Investigation	7/01/2019	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	7	<0.3	21	11	64	0.13	2.9	47
QT1	ILD of of BH102_0.2-0.3		<25	<50	<100	<100	<0.2	<0.5	<1	<3	5	<0.4	25	26	49	0.1	10	42
RPD		-	*0.00*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*33.33*	*NA*	*17.39*	**81.08**	*26.55*	*26.09*	**110.08**	*11.24*
Rinsate Blanks																		
BH100_QR1	Equipment rinsate	8/1/2019	<50	<60	<500	<500	<0.5	1	<0.5	<1.5	<1	<0.1	<1	<1	<1	<0.1	<1	<5
Trip Spikes																		
BH100_QTS1	Soil trip spike	8/1/2019	-	-	-	-	[97%]	[95%]	[107%]	[108%]	-	-	-	-	-	-	-	-
Trip Blanks																		
BH100_QTB1	Soil trip blank	8/1/2019	-	-	-	-	<0.1	<0.1	<0.1	<0.3	-	-	-	-	-	-	-	-

NOTE: All results are reported in mg/kg (soil) or µg/L (water)

66.67	RPD calculated by halving detection limit exceeds 30-50% range referenced from AS4482.1 (2005)
52.87	RPD exceeds 30-50% range referenced from AS4482.1 (2005)

F1 = TRH C6-C10 less the sum of BTEX
F2 = TRH >C10-C16 less naphthalene
F3 = TRH >C16-C34
F4 = TRH >C34-C40

[1] Value shown is the lowest recovery value reported for xylenes

APPENDIX H
Laboratory QA/AC Policies and DQOs

Table QC1 - Containers, Preservation Requirements and Holding Times - Soil			
Parameter	Container	Preservation	Maximum Holding Time
Acid digestible metals and metalloids - Total and TCLP (As,Cd.,Cu,Cr,Ni,Pb,Zn)	Glass with Teflon Lid	Nil	6 months
Mercury	Glass with Teflon Lid	Nil	28 days
TPH / BTEX / VOC / SVOC / CHC	Glass with Teflon Lid	4°C, zero headspace	14 days
PAHs (total and TCLP)	Glass with Teflon Lid	4°C [1]	14 days
Phenols	Glass with Teflon Lid	4°C [1]	14 days
OCPs, OPPs and total PCBs	Glass with Teflon Lid	4°C [1]	14 days
Asbestos	Sealed Plastic Bag	Nil	N/A

Table QC2 - Containers, Preservation Requirements and Holding Times - Water			
Parameter	Container Volume (mL)	Preservation	Maximum Holding Time
Heavy Metals	125mL Plastic	Field filtration 0.45μm HNO_3 / 4°C	6 months
Cyanide	125mL Amber Glass	pH > 12 NaOH / 4°C	6 months
TPH (C6-C9) / BTEX / VOCs SVOCs / CHCs	4 x 43mL Glass	HCl / 4°C [1]	14 days
TPH (C10-C36) / PAH / Phenolics OCP / OPP / TDS / pH	3 x 1L Amber Glass	None / 4°C [1]	28 days

Notes: [1] = Extraction within 14 days, Analysis within 40 days.

Table QC3 - Analytical Parameters, PQLs and Methods - Soil			
Parameter	**Unit**	**PQL**	**Method Reference**
Metals in Soil			
Arsenic - As[1]	mg / kg	1	USEPA 200.7
Cadmium - Cd[1]	mg / kg	0.5	USEPA 200.7
Chromium - Cr[1]	mg / kg	1	USEPA 200.7
Copper - Cu[1]	mg / kg	1	USEPA 200.7
Lead - Pb[1]	mg / kg	1	USEPA 200.7
Mercury - Hg[2]	mg / kg	0.1	USEPA 7471A
Nickel - Ni[1]	mg / kg	1	USEPA 200.7
Zinc - Zn[1]	mg / kg	1	USEPA 200.7
Total Petroleum Hydrocarbons (TPHs) in Soil			
C_6-C_9 fraction	mg / kg	25	USEPA 8260
C_{10}-C_{14} fraction	mg / kg	50	USEPA 8000
C_{15}-C_{28} fraction	mg / kg	100	USEPA 8000
C_{29}-C_{36} fraction	mg / kg	100	USEPA 8000
BTEX in Soil			
Benzene	mg / kg	1	USEPA 8260
Toluene	mg / kg	1	USEPA 8260
Ethylbenzene	mg / kg	1	USEPA 8260
m & p Xylene	mg / kg	2	USEPA 8260
o- Xylene	mg / kg	1	USEPA 8260
Other Organic Contaminants in Soil			
PAHs	mg / kg	0.05-0.2	USEPA 8270
CHCs	mg / kg	1	USEPA 8260
VOCs	mg / kg	1	USEPA 8260
SVOCs	mg / kg	1	USEPA 8260
OCPs	mg / kg	0.1	USEPA 8140, 8080
OPPs	mg / kg	0.1	USEPA 8140, 8080
PCBs	mg / kg	0.1	USEPA 8080
Phenolics	mg / kg	5	APHA 5530
Asbestos			
Asbestos	mg / kg	Presence / Absence	AS4964-2004

Notes:

1. Acid Soluble Metals by ICP-AES
2. Total Recoverable Mercury

Table QC4 - Analytical Parameters, PQLs and Methods - Groundwater

Parameter	Unit	PQL	Method
Heavy Metals			
Antimony - Sb	µg/L	1	USEPA 200.8
Arsenic - As	µg/L	1	USEPA 200.8
Beryllium - Be	µg/L	0.5	USEPA 200.8
Cadmium - Cd	µg/L	0.1	USEPA 200.8
Chromium - Cr	µg/L	1	USEPA 200.8
Cobalt - Co	µg/L	1	USEPA 200.8
Copper - Cu	µg/L	1	USEPA 200.8
Lead - Pb	µg/L	1	USEPA 200.8
Mercury - Hg	µg/L	0.5	USEPA 7471A
Molybdenum - Mo	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Selenium - Se	µg/L	1	USEPA 200.8
Silver - Ag	µg/L	1	USEPA 200.8
Tin (inorg.) - Sn	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Zinc - Zn	µg/L	1	USEPA 200.8
Total Petroleum Hydrocarbons (TPHs)			
C_6-C_9 fraction	µg/L	10	USEPA 8220A / 8000
C_{10}-C_{14} fraction	µg/L	50	USEPA 8000
C_{15}-C_{28} fraction	µg/L	100	USEPA 8000
C_{29}-C_{36} fraction	µg/L	100	USEPA 8000
BTEX			
Benzene	µg/L	1	USEPA 8220A
Toluene	µg/L	1	USEPA 8220A
Ethylbenzene	µg/L	1	USEPA 8220A
m- & p-Xylene	µg/L	2	USEPA 8220A
o-Xylene	µg/L	1	USEPA 8220A
Polyciclic Aromatic Hydrocarbons (PAHs)			
PAHs	µg/L	0.1	USEPA 8270
Benzo(a)pyrene	µg/L	0.01	USEPA 8270
OrganoChlorine Pesticides (OCPs)			
Aldrin	µg/L	0.001	USEPA 8081
Chlordane	µg/L	0.001	USEPA 8081
DDT	µg/L	0.001	USEPA 8081
Dieldrin	µg/L	0.001	USEPA 8081
Endosulfan	µg/L	0.001	USEPA 8081
Endrin	µg/L	0.001	USEPA 8081
Heptachlor	µg/L	0.001	USEPA 8081
Lindane	µg/L	0.001	USEPA 8081
Toxaphene	µg/L	0.001	USEPA 8081

Parameter	Unit	PQL	Method
Chlorinated Hydrocarbons (CHCs)			
1,2-dichlorobenzene	µg/L	1	USEPA 8260B
1,3-dichlorobenzene	µg/L	1	USEPA 8260B
1,4-dichlorobenzene	µg/L	1	USEPA 8260B
1,2,3-trichlorobenzene	µg/L	1	USEPA 8260B
1,2,4-trichlorobenzene	µg/L	1	USEPA 8260B
Hexachlorobutadeine	µg/L	1	USEPA 8260B
1,1,2-trichloroethane	µg/L	1	USEPA 8260B
Hexachloroethane	µg/L	10	USEPA 8270D
Other CHCs	µg/L	1	USEPA 8260B
Volatile Organic Compounds (VOCs)			
Aniline	µg/L	10	USEPA 8260B
2,4-dichloroaniline	µg/L	10	USEPA 8260B
3,4-dichloroaniline	µg/L	10	USEPA 8260B
Nitrobenzene	µg/L	50	USEPA 8260B
2,4-dinitrotoluene	µg/L	50	USEPA 8260B
2,4,6-trinitrotoluene	µg/L	50	USEPA 8260B
Phenolic Compounds			
Phenol	µg/L	10	USEPA 8041
2-chlorophenol	µg/L	10	USEPA 8041
4-chlorophenol	µg/L	10	USEPA 8041
2, 4-dichlorophenol	µg/L	10	USEPA 8041
2,4,6-trichlorophenol	µg/L	10	USEPA 8041
2,3,4,6-tetrachlorophenol	µg/L	10	USEPA 8041
Pentachlorophenol	µg/L	10	USEPA 8041
2,4-dinitrophenol	µg/L	10	USEPA 8041
Miscellaneous Parameters			
Total Cyanide	µg/L	5	APHA 4500C&E-CN
Fluoride	µg/L	10	APHA 4500 F-C
Salinity (TDS)	mg/L	1	APHA 2510
pH	units	0.1	APHA 4500H+
OrganoPhosphate Pesticides (OPPs)			
Azinphos Methyl	µg/L	0.01	USEPA 8141
Chloropyrifos	µg/L	0.01	USEPA 8141
Diazinon	µg/L	0.01	USEPA 8141
Dimethoate	µg/L	0.01	USEPA 8141
Fenitrothion	µg/L	0.01	USEPA 8141
Malathion	µg/L	0.01	USEPA 8141
Parathion	µg/L	0.01	USEPA 8141
Temephos	µg/L	0.01	USEPA 8141
Polychlorinated Biphenyls (PCBs)			
Individual PCBs	µg/L	0.01	USEPA 8081

Table QC5 - QC Sample Data Acceptance Criteria

QC Sample Type	Method of Assessment	Acceptable Range
Field QC		
Blind Duplicates and Split Samples	The assessment of split duplicate is undertaken by calculating the Relative Percent Difference (RPD) of the duplicate concentration compared with the primary sample concentration. The RPD is defined as: $RPD = 100 \times \frac{\lvert X_1 - X_2 \rvert}{\text{mean}(X1, X2)}$ Where: X_1 and X_2 are the concentrations of the primary and duplicate samples.	The acceptable range depends upon the levels detected: - 0-150% RPD (when the average concentration is <5 times the LOR/PQL) - 0-75% RPD (when the average concentration is 5 to 10 times the LOR/PQL) - 0-50% RPD (when the average concentration is >10 times the LOR/PQL)
Rinsate & Trip Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL
Laboratory prepared Trip Spike	The Trip Spike is analysed after returning from the field and the % recovery of the known spike is calculated.	70 - 130%
Laboratory QC		
Laboratory Duplicates	Assessment of Lab Duplicate RPD as per Blind Duplicates and Split Samples.	Lab Duplicate RPD < 15% (Inorganics) Lab Duplicate RPD < 30% (Organics) for sample results > 10 LOR
Surrogates Matrix Spikes Laboratory Control Samples	Assessment is undertaken by determining the percent recovery of the known surrogate spike (SS) or addition to the sample. $\%\ Recovery = 100 \times \frac{C - A}{B}$ Where: A = Concentration of analyte determined in the original sample; B = Added Concentration; and C = Calculated Concentration.	at least 2 SS recoveries to be within 70-130% subject to matrix effects (Organics) 80-120% (Inorganics / Metals) 60-140% (Organics) 10-140% (SVOC and Speciated Phenols) If the result is outside the above ranges, the result must be <3x Standard Deviation of the Historical Mean (calculated over the past 12 months).
Sample Matrix Spike Duplicates	Recovery RPD	<30% (Inorganics & Organics)
Calibration Check Standars	Continuous Calibration Verification (CCV)	CCV must be within ±15% (inorganics) CCV must be within ±25% (inorganics)
Reagent, Method & Calibration Check Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL

Note: PQL - Laboratory Practical Quantitation Limit (PQL) or the minimum detection limit for a particular analyte.
LOR = Limit of Reporting

SGS Environmental Services is accredited by NATA for Chemical Testing (Reg.No.2562) and Quality System compliance to ISO/IEC 17025. The QC parameters contained within are designed to meet NEPM 1999 requirements.

Quality Control samples included in any analytical run are listed below.

Reagent/Analysis Blank (BLK) **Method Blank (MB)**	Sample free reagents carried through the preparation/extraction/digestion procedure and analysed at the beginning of every sample batch analysis. A reagent blank is prepared and analysed with every batch of samples plus with each new batch of solvent prior to use.
Sample Matrix Spike (MS) & Matrix Spike Duplicate (MSD)	Sample replicates spiked with identical concentrations of target analyte(s). The spiking occurs during the sample preparation and prior to the extraction/digestion procedure. They are used to document the precision and bias of a method in a given sample matrix. Where there is not enough sample available to prepare a spiked sample, another known soil/sand or water may be used. A duplicate spiked sample is analysed at least every 20 samples.
Surrogate Spike (SS)	At least one but up to three surrogate compounds are added to all samples requiring analysis for organics prior to extraction. Used to determine the extraction efficiency. They are organic compounds which are similar to the target analyte(s) in chemical composition and behaviour in the analytical process, but which are not normally found in environmental samples. Where possible they are surrogate compounds recommended by the USEPA.
Control Matrix Spike (CMS)	To ensure spike recoveries can be determined for every batch of samples a control matrix is spiked with identical concentrations of target analyte(s) and then analysed. These results allow recoveries to be determined in the event that the matrix spikes are unusable (eg. matrix spikes performed on heavily contaminated samples). These are analysed at least every 20 samples.
Internal Standard (IS)	Added to all samples requiring analysis for organics (where relevant) after the extraction process; the compounds serve to give a standard of retention time and response, which is invariant from run-to-run with the instruments. Where possible they are standard compounds recommended by the USEPA.
Lab Duplicates (D)	A separate portion of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.
Lab Control Standards/Samples (LCS)	Prepared from a source independent of the calibration standards. At least one control standard is included in each run to confirm calibration validity. Thereafter they are analysed at least every one in 20 samples plus at the end of each analytical run. This data is not reported.
Continuous Calibration Verification (CCV) or **Calibration Check Standard & Blank**	A calibration check standard or CCV and blank are run after every 20 samples of an instrumental analysis run to assess analytical drift. Calibration Standards are checked old versus new with a criteria of ±10%

Quality Assurance Programs are listed below:

Statistical analysis of Quality Control data (SQC)	Quality control data is plotted on control charts using the APHA procedure with warning and control limits at 2 and 3 standard deviations respectively. See also QMS Procedure "Statistical Quality Control".
Certified Reference Materials (CRM/SRM)	Certified Reference Materials and Standards are regularly analysed. These materials/standards have certified reference values for various parameters.
Proficiency Testing	Regular proficiency test samples are analysed by our laboratories. SGS Environmental participates in a number of programs. Results and proficiency status are compiled and sent to participating laboratory post data interpretation. Failure to comply with acceptable values result in further investigations.
Inter-laboratory & Intra-laboratory Testing	SGS Environmental Services has schedules in the Quality Systems to participate in Inter/Intra laboratory testing conducted internally and by other parties.
Data Acceptance Criteria Unless otherwise specified in the method or method manual the following general criteria apply to all inorganic tests. All recoveries are to be reported to 3 significant figures.	Failure to meet the internal acceptance criteria will result in sample batch repeats dependent upon investigation outcomes. For data to be accepted: <u>Inorganics (water samples)</u> • For all inorganic analytes the Reagent & Method Blanks must be less than the LOR. • The Calibration Check Standards or Continuous Calibration Verification (CCV) must be within ±15%. • Control Standards must be 80-120% of the accepted value. • The Calibration Check Blanks must be less than the LOR. • Lab Duplicates RPD to be <15%*. Note: If client <u>field</u> duplicates do not meet this criteria it may indicate heterogeneity and shall be noted on the data reports for QC samples. • Sample (and if applicable Control) Matrix Spike♬ Duplicate recovery RPD to be <30%. • Where CRMs are used, results to be within ±2 standard deviations of the expected value. <u>Inorganics (soil samples)</u> • For all inorganic analytes the Reagent & Method Blanks must be less than the LOR. • The Calibration Check Standards or Continuous Calibration Verification (CCV) must be within ±15%. • Control Standards must be 80-120% of the accepted value. • The Calibration Check Blanks must be less than the LOR. • Lab duplicate RPD to be <30%* for sample results greater than 10 times LOR. • Sample Matrix Spike Duplicate (MS♬/MSD) recovery RPD to be <30%. In the event that the matrix spike has been applied to samples whose matrix or contamination is problematic to the method then these acceptance criteria apply to the Control Matrix Spike (CMS/D). • Where CRMs are used, results to be within ± 2 standard deviations of the expected value.

Data Acceptance Criteria Unless otherwise specified in the method or method manual the following general criteria apply to all organic tests. All recoveries are to be reported to 3 significant figures.	Organics • Volatile & extractable Reagent & Method Blanks must contain levels less than or equal to LOR. • The Calibration Check Standards or Continuous Calibration Verification (CCV) must be within ±25%. Some analytes may have specific criteria. • Control Standards (LCS/CMS) and Certified Reference Materials (CRM) recoveries are to be within established control limits or as a default 60-140% unless compound specific limits apply. • Retention times are to vary by no more than 0.2 min. • **At least two of three** routine level soil sample Surrogate Spike (SS) recoveries 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 acceptance criterion. Any recoveries outside these limits will have comment. • Water sample Surrogates Spike (SS) recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion. Any recoveries outside these limits will have comment. • Lab Duplicates (D) must have a RPD <30%*. • Sample Matrix Spike Duplicate (MS♬/MSD) recovery RPD to be <30%. In the event that the matrix spike has been applied to samples whose matrix or contamination is problematic to the method then these acceptance criteria apply to the Control Matrix Spike (CMS/D).

*Only if results are at least 10 times the LOR otherwise no acceptance criteria for RPD's apply. Application of more stringent criteria shall be applied for clean water sample from water boards and any other nominated client contracts. Nominal 10xLOR criteria are dropped to 5xLOR where specified.
♬Matrix do not readily equate to definitive recovery due to inherent matrix interferences and thus do not have recovery compliance values set. As a guide inorganic recoveries should be between 70-130% and for organics 60-130%

Batch Structure Summary

An analytical batch is nominally considered as 20 samples or smaller. As a standard template the following should be **used as a guide** according to the above Quality Control Types:

1	MB	16	UNK_DUP
2	STD1	17	MS
3	STD2	18	MS_DUP
4	STD3	19	UNK 11
5	LCS	20	UNK 12
6	BLK	21	UNK 13
7	UNK 1	22	UNK 14
8	UNK 2	23	UNK 15
9	UNK 3	24	UNK 16
10	UNK 4	25	UNK 17
11	UNK 5	26	UNK 18
12	UNK 6	27	UNK 19
13	UNK 7	28	UNK 20 (SS if applicable)
14	UNK 8	29	UNK_DUP
15	UNK 9	30	CCV
16	UNK 10 (SS if applicable)	31	CRM / SRM / CMS / LCS