GEOTECHNIQUE® PTY LTD

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Job No: 14396/2
Our Ref: 14396/2-AA
19 March 2019

ZYGT Pty Ltd
c/-Craig & Rhodes Pty Ltd
P O Box 3220
RHODES NSW 2138
Email: JBlaine@crhodes.com.au

Attention: Mr J Blaine

Dear Sir

re: **Proposed Residential Subdivision**
Lot 3 in DP1115877 & Part Lot 3 in DP942319
53B & 53 Warriewood Road, Warriewood
Contamination Assessment Report Update

This letter is a contamination assessment report update for a parcel of land currently registered Lot 3 in DP1115877 and Part Lot 3 in DP942319, located at 53B and 53 Warriewood Road, Warriewood (hereafter referred as site), in the local government area of Pittwater, as indicated on Figure 1 below.

FIGURE 1

Map Data ©2019 Google

Geotechnique Pty Ltd prepared a phase 1 preliminary contamination assessment (PCA) report (Report No 13234/2-AA dated 25 August 2014), for the property registered as Lots 2 and 3 in DP1115877 and Part Lot 3 in DP942319, located at 53A, 53B and 53 Warriewood Road, Warriewood and a phase 2 contamination assessment (CA) report (Report No 13757/2-AA dated 27 June 2016) for a parcel of land currently registered as Lots 2 and 3 in DP1115877, located at 53A and 53B Warriewood Road, Warriewood.

The objectives of the Phase 1 PCA were to assess whether the site potentially presents a risk of harm to human health and/or the environment and to determine the suitability of the site for the proposed development. In order to achieve the objectives of the assessment the scope of work included a study of site history, geological and hydrogeological information and a site inspection.

As the site is proposed for residential development, a suitable sampling and testing plan, as a detailed contamination assessment (Phase 2 CA), was recommended in the Phase 1 PCA to address the potential for contamination listed in Section 7.0 of the Phase 1 PCA report.

The objective of the Phase 2 CA was to supplement the Phase 1 PCA Report 13234/2-AA with appropriate soil sampling and testing, in order to ascertain whether the site is likely to present a risk of harm to human health and/or the environment.

In order to achieve the objective of the assessment, the scope of work included review of the phase 1 preliminary contamination assessment report, site reconnaissance, test pit excavation, soil sampling and testing.

The findings of the Phase 2 CA are summarised as follows:

- The site comprised two individual rural residential properties facing Warriewood Road.
- The site is proposed for residential development involving construction of residential dwellings and townhouses/apartment buildings with three storeys above the ground and one level of basement car park.
- The entire site is underlain by imported and site originated fill overlying natural clayey silt, sandy silt and clayey soil. The test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of fibro-cement pieces in the fill profile at test pit TP25. Moreover, one fibro-cement piece at the ground surface of each of two judgmental sampling locations (FCP1 and FCP2) was also observed. Both fibro-cement pieces were sent to laboratory for asbestos analysis. No other fibro-cement pieces were found on the ground surface at FCP1 and FCP2.
- All the laboratory test results satisfied the criteria for stating that the analytes selected are either not present i.e. concentrations less than laboratory limits of reporting, or present in the sampled soil at concentrations that do not pose a risk of hazard to human health or the environment under a “residential with access to soil” form of development, with the exception of elevated cadmium and PAH concentrations and detection of friable asbestos and bonded asbestos containing material (ACM) fragments, as indicated on Drawing No 13757/2-AA2. Elevated Benzo(a)Pyrene TEQ concentrations and friable asbestos presents a risk of harm to human health, whilst elevated Benzo(a)Pyrene (BaP) and cadmium concentrations might impact on terrestrial ecosystems or on the growth of certain plants. ACM fragments present a potential risk of harm to human health.

The site is considered suitable for the proposed residential development subject to implementation of the following recommendations prior to site preparation and earthworks:

- Detailed sampling and testing in the vicinity of locations of concern, as indicated on Drawing No 13757/2-AA2, to delineate the extent of contamination.
- Sampling and testing of soils in the footprints of site features such as the houses, building, sheds, carport, glasshouse, concrete, recycled asphalt, gravel and bitumen covered areas, after complete demolition and removal or clearing.
- Development of a remedial action plan (RAP) to remediate PAH and asbestos contaminated fill materials with elevated Metals concentrations plus any other contamination identified through the recommended additional sampling and testing, followed by appropriate validation. We consider that the site can be made suitable for the proposed development following appropriate remediation and validation.

At the time of inspection on 18 March 2019 by an Environmental Engineer from Geotechnique as a part of report updated, the site comprised two (2) individual properties (53 and 53B Warriewood Road) facing Warriewood Road, as mostly observed during Phase 1 PCA in July 2014 and during the Phase 2 CA in May 2016. Couple of additional features were noted such as scrap metals, chicken pen, as indicated on the attached Site Features Drawing No 14396/2-AA1. A new residential housing had been constructed to the east of the site.

As the site inspection raises few more additional concern, and as no sampling has been carried out for Part Lot 3 in DP942319, located at 53 Warriewood Road, Warriewood, in our opinion we consider that the parcel of land currently registered Lot 3 in DP1115877 and Part Lot 3 in DP942319, located at 53B and 53 Warriewood Road, Warriewood is suitable for the proposed residential development subject to implementation of the following recommendations prior to site preparation and earthworks:

- Systematic sampling and testing of soil within Part Lot 3 in DP942319.
- Detailed sampling and testing in the vicinity of locations of concern, as indicated on Drawing No 13757/2-AA2, to delineate the extent of contamination, except location FCP2 which is located outside the current site boundary.
- Sampling and testing of soils in the footprints of site features such as the houses, sheds, gravel and bitumen covered areas, in ground pool, scrap metals, chicken pen after complete demolition and removal or clearing.
- Development of a remedial action plan (RAP) to remediate PAH and asbestos contaminated fill materials with elevated Metals concentrations plus any other contamination identified through the recommended additional sampling and testing, followed by appropriate validation. We consider that the site can be made suitable for the proposed development following appropriate remediation and validation.

For any materials to be excavated and removed from the site, it is recommended that waste classification of the materials is undertaken,, in accordance with the "Waste Classification Guidelines Part 1: Classifying Waste" NSW EPA 2014 and NSW EPA guidelines for the resource recovery exemptions under the Protection of the Environment Operations (Waste) Regulation 2005, prior to disposal at an appropriately licensed landfill or potential re-use at other sites.

It should be noted that since the site was used in the past for agricultural activities, there is potential for buried irrigation pipes to remain beneath the site surface. It is also possible that the pipes might be formed from bonded asbestos. If any asbestos pipes are uncovered, a suitably qualified asbestos removal contractor must be engaged to carry out removal.

If suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheets/pieces/pipes, ash material, etc.) are encountered during future site preparation/demolition/remediation we recommend that this office is contacted for assessment. In the event of contamination, detailed assessment, remediation and validation will be necessary.

Any imported soil (fill) must be assessed by a qualified environmental consultant, prior to importation, to ensure suitability for the proposed use. In addition, the imported fill must not contain asbestos and ash, be free of unusual odour, not be discoloured and not acid sulphate soil or potential acid sulphate soil. The imported fill should either be virgin excavated natural material (VENM) or excavated natural material (ENM).

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECHNIQUE PTY LTD

ANWAR BARBHUYIA
Senior Associate
B.E (Civil), MEngSc (Enviro), MIEAust

Attached: Drawing No 14396/2-AA – Site Features

Imagery ©2019 NearMap.com

0 15 30 45 60 75m

Scale 1:1500

PREPARED BY:

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Craig & Rhodes Pty Ltd
Proposed Residential Development
Lot 3 in DP1115877 & Part Lot 3 in DP942319
53B & 53 Warriwood Road, Warriewood

Site Features

Drawing No: 14396/2-AA1
Job No: 14396/2
Drawn By: MH
Date: 19 March 2019
Checked By: SS/AB

File No: 14396-2
Layers: 0, AA1

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ABN 64 002 841 063

Member of
Australian Contaminated
Land Consultants Association Inc

Quality
ISO 9001
SAI GLOBAL

Job No: 1132341
Our Ref: 13234/1-AA
15 August 2014

Intercapital Consultants
155 Regent Street
RIVERSTONE NSW 2765
Email: len@intercapital.ws

Attention: Mr L Mariani

Dear Sir

re: **Proposed Residential Development**
53 Warriewood Road, Warriewood
Geotechnical Investigation

This report provides the results of a geotechnical investigation carried out at 53 Warriewood Road, Warriewood. This investigation was carried out in conjunction with the geotechnical investigation in 53c Warriewood Road, Warriewood, which is adjacent property to the east. Therefore, information obtained from boreholes drilled in both these sites and results of laboratory tests on samples from both these sites were used in providing assessments and recommendations presented in this report.

We understand that the proposed development at the site includes construction of medium density residential buildings. Details of the proposed buildings were not provided but construction of the proposed buildings is anticipated to involve not more than 3.0m deep excavations.

A geotechnical investigation is required for the following;

- To assess sub-surface conditions across the site in order to provide geotechnical information for design of basement excavation, retaining structures, floor slabs and footings.
- To assess if soils to be excavated or disturbed during construction of the proposed building are saline and acid sulphate or potentially acid sulphate soils and if so, provide a draft Acid Sulphate Soil Management Plan (ASSMP).

Background Information

Based on the Geological Map of Sydney (scale 1:100,000), the subsurface materials across the site is anticipated to be stream alluvium and/or estuarine sand, comprising silty to peaty quartz sand, silt and clay, ferruginous and humic at places, with shell layers.

Reference to the Soil Landscape Map of Sydney (scale 1:100,000) indicates that the landscape at the site belongs to Warriewood Group, which is characterised by level to gently undulating swales, depressions and in filled lagoons on Quaternary sand, with local relief of less than 10m, ground slopes of less than 3%, depth to water table of less than 2.0m. Soils in this group comprise sandy humus, sand and peaty, with thickness exceeding 1.5m. This landscape has high watertable and is subjected to flooding.

Acid Sulphate Soil Risk Map (Edition 2, scale 1:25,000) of Hornsby/Mona Vale prepared by Department of Land and Water Conservation indicates that there is high probability of occurrence of acid sulphate soil materials within the soil profile across at the site. Therefore, there is severe environmental risk if the proposed development results in disturbance of acid sulphate soils.

Field Work

Field work for the geotechnical investigation was carried out during 25 to 29 July 2014 and consisted of the following;

- A walkover survey to assess general site conditions.
- Review services plans obtained from "Dial Before You Dig" to ascertain the locations of underground services across the site.
- Scanning proposed borehole locations for underground services to ensure that the investigation works would not damage existing underground services. We engaged a specialist services locater for this purpose.
- Drilling eight boreholes (BH1 to BH8) using a truck mounted drilling rig fully equipped for geotechnical investigation. Boreholes were uniformly distributed in accessible portions across 53 and 53c Warriewood Road. Boreholes were drilled using V-bit and terminated in alluvial soils or bedrock at depths of about 6.5m to 19.2m from existing ground surface. Approximate borehole locations are indicated on the attached Drawing No 13234/1-AA1. Borehole logs and explanatory notes are also attached.
- Carry out Standard Penetration Tests (SPT) in the boreholes at regular depth intervals to assess the strength characteristics of the sub-surface soils.
- Recover representative soil samples and rock cores from the boreholes for visual classification and laboratory tests.
- Measure depths to groundwater level in boreholes, if encountered.

Field work was supervised by a Field Engineer from this company, responsible for nominating the borehole locations, sampling and preparation of field logs.

Site Conditions

The site is of trapezoidal shape with street frontage of about 46.5m and measuring approximately 9251m^2 in plan. The following observations were made during field work;

- The site is bound by Warriewood Road, Warriewood to the north east, Narrabeen Creek to the south west and residential lots in two remaining sides.
- There is a single storey house and several sheds in the north eastern portion of the site and remaining portions of the site are vacant and grass covered.
- The natural ground surface across the site dips from the north-east towards the south-west. The ground surface slope in the northern half of the site is about 4 to 5 degrees but the southern half of the site is almost flat. There is about 1.0m to 2.0 high fill embankment along the north western boundary of the site.

Sub-surface profiles encountered in the boreholes are detailed in the attached borehole logs and summarised below in Table 1.

Table 1 – Sub-surface Profiles at Borehole Locations

Borehole No	Ground Surface RL (m, AHD)	Termination Depth* (m)	Depth Range for Topsoil/Fill (m)	Depth Range for Alluvium (m)	Depth to Bedrock (m)	Depth to Groundwater (m)
BH1	3.6	18.50	0.0-0.3	0.3->18.50	Not Encountered	1.2
BH2	3.2	15.45	0.0-0.2	0.2->15.45	Not Encountered	0.9
BH3	4.0	15.45	0.0-0.5	0.5->15.45	Not Encountered	1.4
BH4	4.4	15.45	0.0-0.2	0.2-15.45	Not Encountered	0.8
BH5	10.0	6.50	0.0-0.5	0.5-6.40	6.40	Not Encountered
BH6	5.8	14.80	0.0-0.2	0.2-14.50	14.50	3.5
BH7	7.0	10.70	0.0-0.3	0.3-10.50	10.50	1.5
BH8	3.2	19.50	0.0-1.0	1.0-19.20	19.20	1.0

RL are Approximate only.

Table 1 indicates that the sub-surface profile across the site comprises a sequence of topsoil/fill and alluvial soils underlain by bedrock. The depth to alluvial soils and bedrock across the site is anticipated to vary from 0.2m to 1.0m and 5.0m to 20.0m respectively.

Topsoil was predominantly fine to medium grained silty clayey sand and silty sand with some roots and gravel. Fill included silty sandy clay of medium plasticity with some gravel and crushed concrete. Alluvial soils included fine to coarse grained silty sand and silty clayey sand with layers of medium plasticity silty clay and silty sandy clay. Bedrock to borehole termination depths was fine to medium grained sandstone.

Groundwater level was encountered in all boreholes except one borehole BH5 at depths ranging from 0.9m to 3.5m from existing ground surface. Borehole BH5 is located in the northern portion of the site at higher elevation (RL 10.0 AMD) where bedrock was encountered at depth of 6.4m without encountering groundwater level. In remaining portions of the site the elevation of groundwater surface is assessed to vary from about RL2.0m to 5.5m AHD. It should however be noted that the depth to groundwater level could be affected by rainfall and other factors not evident during investigation.

Laboratory Testing

Representative soil samples recovered from the boreholes were tested in the NATA accredited laboratory of SGS Environmental Services to determine the chemical properties to assess the following;

- Salinity of soil in terms of Electrical Conductivity (EC)
- Aggressivity of soil in terms of pH, chloride, sulphate and resistivity
- Acid sulphate soils in terms of of **pH_{KCl}, pH_{ox}**(pH after oxidation), **TPA** (Total Potential Acidity), **TAA** (Total Actual Acidity), **TSA** (Total Sulphidic Acidity), **S_{POS}%** (Percent Peroxide Oxidisable Sulfur) and **S_{cr}** (Chromium Reducible Sulphur).

Detailed laboratory test results are attached and summaries are presented in the following Tables 2 to 4.

Table 2 – Results of Electrical Conductivity Tests

Borehole No	Depth (m)	EC (µS/cm)	Assessed Salinity		Borehole No	Depth (m)	EC (µS/cm)	Assessed Salinity
BH1	0.5-0.95	86.0	Non-Saline		BH3	15.0-15.45	110.0	Non-Saline
BH1	1.5-1.95	75.0	Non-Saline		BH4	1.0-1.45	45.0	Non-Saline
BH1	3.0-3.45	56.0	Non-Saline		BH4	3.0-3.45	50.0	Non-Saline
BH1	4.5-4.95	33.0	Non-Saline		BH4	6.0-6.45	110.0	Non-Saline
BH1	7.5-7.95	130.0	Non-Saline		BH5	1.0-1.45	57.0	Non-Saline
BH1	6.0-6.45	780.0	Very Saline		BH5	3.0-3.45	54.0	Non-Saline
BH1	9.0-9.45	95.0	Non-Saline		BH5	6.0-6.45	80.0	Non-Saline
BH1	10.5-10.95	41.0	Non-Saline		BH6	1.0-1.45	140.0	Non-Saline
BH1	15.0-15.45	40.0	Non-Saline		BH6	3.0-3.45	82.0	Non-Saline
BH2	1.0-1.45	30.0	Non-Saline		BH6	6.0-6.45	70.0	Non-Saline
BH2	3.0-3.45	100.0	Non-Saline		BH7	1.0-1.45	75.0	Non-Saline
BH2	6.0-6.45	220.0	Slightly Saline		BH7	3.0-3.45	72.0	Non-Saline
BH2	9.0-9.45	130.0	Non-Saline		BH7	6.0-6.45	110.0	Non-Saline
BH2	12.0-12.45	63.0	Non-Saline		BH7	9.0-9.45	73.0	Non-Saline
BH2	15.0-15.45	59.0	Non-Saline		BH8	0.5-1.0	80.0	Non-Saline
BH3	1.0-1.45	69.0	Non-Saline		BH6	120-12.45	120.0	Non-Saline
BH3	3.0-3.45	76.0	Non-Saline		BH8	3.0-3.45	60.0	Non-Saline
BH3	6.0-6.45	120.0	Non-Saline		BH8	6.0-6.45	62.0	Non-Saline
BH3	9.0-9.45	71.0	Non-Saline		BH8	9.0-9.45	30.0	Non-Saline
BH3	12.0-12.45	53.0	Non-Saline		BH8	12.0-12.45	33.0	Non-Saline

Table 3 – Results of Soil Aggressivity Tests

Borehole No	Depth (m)	pH	Chloride (mg/kg)	Sulphate (mg/kg)	Resistivity (ohm-cm)
BH1	0.5-0.95	7.2	4.3	8.7	5500
BH1	1.5-1.95	5.3	21.0	56.0	5800
BH1	3.0-3.45	5.5	26.0	4.0	13000
BH1	4.5-4.95	5.4	21.0	6.3	15000
BH1	7.5-7.95	6.4	16.0	110.0	4100
BH1	6.0-6.45	6.9	35.0	630.0	1200
BH1	9.0-9.45	6.6	22.0	25.0	4700
BH1	10.5-10.95	6.6	16.0	16.0	11000
BH1	15.0-15.45	5.6	7.4	23.0	18000
BH5	1.0-1.45	4.2	5.9	46.0	18000
BH5	3.0-3.45	3.7	4.5	57.0	16000
BH5	6.0-6.45	3.9	20.0	70.0	9900
BH6	120-12.45	4.4	140.0	41.0	7200

Table 4 – Results of Acid Sulphate Soil Tests

Borehole No	Depth (m)	pH_{KCl}	pH_{ox}	TPA (pH6.5)	TAA (pH6.5)	TSA (pH6.5)	S_{POS} (% w/w)	Scr (% w/w)
BH1	0.5-1.0	6.2	4.6	<5	<5	<5	0.022	<0.005
BH1	1.5-2.0	6.2	5.3	<5	<5	<5	0.009	<0.005
BH5	0.5-1.0	6.0	5.0	<5	<5	<5	0.009	<0.005
BH8	1.5-2.0	4.4	4.5	60	61	<5	0.028	0.022

Notes

pH_{KCl} = pH of filtered 1:20, 1M K_{Cl} extract, overnight shake
pH_{ox} = pH of filtered 1:20, 1M K_{Cl} after peroxide digestion
TPA = Total Potential Acidity (mol H^+/tonne)
TAA = Total Actual Acidity (mol H^+/tonne)
TSA = Total Sulphidic Acidity (mol H^+/tonne)
S_{POS} = Peroxide Oxidisable Sulphur (%w/w)
$\mathbf{S_{cr}}$ = Chromium Reducible Sulphur (% w/w)
Limit of Reporting for TAA, TPA and TSA is 5 moles H^+/tonne, and for S_{POS} is 0.005% w/w.

DISCUSSION AND RECOMMENDATIONS

Soil Salinity

Salinity refers to the presence of excess salt in the environment, either in soil or water. Salinity is a serious problem for any development due to the many environmental, economic and social impacts.

Soil salinity is generally assessed by measuring Electrical Conductivity (EC) of a soil sample made up of 1:5 soil water suspension. Thus, determined Electrical Conductivity (EC) is multiplied by a factor varying from 6 to 23, based on the texture of the soil sample, to obtain Corrected Electrical Conductivity designated as ECe (Reference 1). Alternatively, ECe may be directly measured in soil saturation extracts. Soils are classified as saline if ECe of the saturated extracts exceed 4.0dS/m. The criteria for assessment of soil salinity classes are shown in the following Table 5 (Reference 1).

Table 5 –Criteria for Soil Salinity Classification

Classification	EC_e (dS/m)	Comments
Non-saline	<2	Salinity effects mostly negligible
Slightly saline	2 – 4	Yields of very sensitive crops may be affected
Moderately saline	4 – 8	Yields of many crops affected
Very saline	8 – 16	Only tolerant crops yield satisfactorily
Highly saline	>16	Only a few tolerant crops yield satisfactorily

Electrical Conductivity (EC) values for forty representative soil samples are summarised in Table 2. For sandy soils encountered across the site multiplying factor of 12 to 14 are considered appropriate. The ECe values for multiplying factor of 14 vary from about 0.42dS/m to 10.92dS/m. However, only one of 40 samples has ECe value of more than 4.0dS/m. Therefore, it is our assessment that the soils likely to be disturbed or excavated during proposed development works are non-saline.

Soil Aggressivity

Aqueous solution of chlorides causes corrosion of iron and steel, including steel reinforcements in concrete. The aggressivity classifications of soil and groundwater applicable to iron and steel, in accordance with Australian Standard AS2159 (Reference 2), are given below in Table 6.

Table 6 – Soil Aggressivity Classification for Steel/Iron

Chloride		pH	Resistivity (ohm cm)	Soil Condition A*	Soil Condition B#
In Soil (%)	In Water (ppm)				
<0.5	<1000	>5.0	>5000	Non-aggressive	Non-aggressive
0.5-2.0	1000-10000	4.0-5.0	2000-5000	Mild	Non-aggressive
2.0-5.0	10000-20000	3.0-4.0	1000-2000	Moderate	Mild
>5.0	>20000	<3.0	<1000	Severe	Moderate

*Soil Condition A = high permeability soils (e.g. sands and gravels) which are below groundwater
#Soil Condition B = low permeability soils (e.g. silts and clays) and all soils above groundwater

The aggressivity classifications of soil and groundwater applicable to concrete, in accordance with Reference 3 are given below in Table 7.

Table 7 – Soil Aggressivity Classification for Concrete

Sulphate expressed as SO_3		pH	Chloride in Water (ppm)	Soil Condition A	Soil Condition B
In Soil (%)	In Groundwater (ppm)				
<0.2	<300	>6.5	<2000	Non-aggressive	Non-aggressive
0.2-0.5	300-1000	5.0-6.0	2000-6000	Mild	Non-aggressive
0.5-1.0	1000-2500	4.5-5.0	6000-12000	Moderate	Mild
1.0-2.0	2500-500	4.0-4.5	12000-30000	Severe	Moderate
>2.0	>5000	<4.0	>30000	Very Severe	Severe

Approximately 100ppm of SO_4 = 80ppm of SO_3

Results of aggressivity tests on thirteen representative soil samples are summarised in Table 3. The soils likely to be encountered during proposed development works are assessed to be sandy in nature with high permeability. Therefore, results of aggressivity tests indicate the following:

- The pH value of soils vary from 3.7 to 7.2, indicating that the site is non-aggressive to moderately aggressive to steel/iron but mildly to severely aggressive to concrete. Severely aggressive site condition is anticipated localised and at depths exceeding 4.0m.
- Chloride contents in soils vary from 4.0ppm to 140.0ppm, indicating the site is non-aggressive to both steel and concrete.
- Sulphate contents in soils vary from 4.0ppm to 630.0 ppm, indicating the site is non-aggressive to concrete.
- Resistivity of soil varies from 1200 ohm-cm to 18000 ohm-cm, indicating the site is non-aggressive to steel.

Based on the laboratory test results and the assumption that soils are predominantly sandy, the site is assessed to be mildly aggressive towards steel and moderately aggressive towards concrete. Therefore, we recommend use of construction materials, such as concrete and steel that are appropriate to assessed aggressivity.

Acid Sulphate Soil Assessment
Review of existing information and site assessment indicated the following:

- The Acid Sulphate Soil Risk Map of Hornsby/Mona Vale indicates that there is high probability of occurrence of acid sulphate soil materials within the soil profile across at the site.
- The southern portion of the site is almost flat with elevation of RL 3.0m to 3.5m AHD and is located adjacent to Narrabeen Creek. The elevation and geomorphology of the site indicate that acid sulphate or potentially acid sulphate soils are likely to be encountered across the site.
- The sub-surface profile across the site comprises a sequence of topsoil/fill and alluvial soil underlain by sandstone. Topsoil/fill as well as alluvial soils likely to be disturbed or excavated during construction of the proposed residence is potentially acid sulphate or potentially acid sulphate soils.
- Groundwater level is likely to be shallower then the base of proposed excavation. Although the level of groundwater might fluctuate due to variations in rainfall and/or other factors not evident during drilling, it is likely that proposed development works will lower the groundwater level, which might adversely impact acid sulphate or potentially acid sulphate soils, if encountered during construction.

The above assessments based on the review of available information indicate acid sulphate or potentially acid sulphate soils may be encountered at the proposed development site. Therefore, representative soil samples from various depths were tested for acid sulphate or potentially acid sulphate soils. The laboratory test results summarised in Table 5 indicate the following:

- The pH_{kcl} (field pH) values are in range of 4.4 to 6.2, indicating actual acid sulphate soils are absent at the site, but does not give an indication whether potential acid sulphate soils are present or not.
- The pH_{ox} values (pH after oxidation) of samples are in range of 4.5 to 5.3, lower than the pH_{kcl} values, indicating that oxidation of soils is likely to produce some acid. However, the reduction in pH values for three samples out of four samples is less than 1 unit. Furthermore, pH_{ox} values are higher than 4.5 indicating soils across the site are unlikely to be actual and potential acid sulphate soils.
- Peroxide Oxidisable Sulphur content in the soil samples is lower than 0.03% and hence oxidation of soils is unlikely to produce any significant acid.
- Chromium Reducible Sulphur content in the soil samples is lower than 0.03% and hence oxidation of soils is unlikely to produce any significant acid.

Assessments of laboratory test results indicate soils across the site are unlikely to be acid sulphate or potentially acid sulphate soils.

Acid sulphate soils are a problem because they produce significant acid (sulphuric acid) by oxidation when exposed to oxygen, which might occur during excavation or disturbance of soils containing iron sulphides/oxidisable sulphur. Lowering the groundwater level might also encourage oxidation.

The New South Wales Acid Sulphate Soils Management Advisory Committee (Reference 3) recommends “Action Criteria” (Table 8) based on results of acid sulphate soils analysis for three broad texture categories. Works in soils that exceed these “Action Criteria” must be carried out in accordance with an approved Acid Sulphate Soils Management Plan.

Table 8 – Action Criteria for Acid Sulphate Soils

Type of Material		**Action Criteria 1-1000 tonnes of soil is disturbed**		**Action Criteria More than 1000 tonnes of soil is disturbed**	
Texture Range	**Approximate Clay Content <0.002mm** (%)	**Sulphur Trail** % S oxidisable (S_{TOS} or S_{POS})	**Acid sulphate Trail** mol H^+/tonne (TPA or TSA)	**Sulphur Trail** % S oxidisable (S_{TOS} or S_{POS})	**Acid sulphate Trail** mol H^+/tonne (TPA or TSA)
Coarse Texture Sands to loamy sands	≤5	0.03	18	0.03	18
Medium Texture Sandy loams to light clays	5-40	0.06	36	0.03	18
Fine Texture Medium to heavy clays and silty clays	≥40	0.10	62	0.03	18

The borehole logs indicate that soils likely to be disturbed or excavated during proposed development are silty sand (medium to coarse texture). Therefore, even if volume of soils to be disturbed or excavated during proposed development works is more than 1000 tonnes, the laboratory test results presented in Table 4 are below Action Criteria for both Sulphur Trail and Acid Trail presented in Table 8.

Therefore, even if information review indicates possibility of acid sulphate soils across the site, it is our assessment that the soils likely to be excavated or disturbed during proposed development are unlikely to be acid sulphate or potentially acid sulphate soils. Therefore, excavations and disturbance of soils during proposed development works may be carried out without an approved "Acid Sulphate Soils Management Plan".

Foundation Conditions

As indicated in Table 1 the sub-surface profile across the site comprises a sequence of topsoil/fill and alluvial soils underlain by bedrock. The table also indicates the following:

- The depth to alluvial soils across the site is anticipated to vary from about 0.2m to 1.0m from existing ground surface. In most portions of the site the alluvial soils are very weak (very soft or very loose) to shallow depths of about 1.0m to 3.0m from existing ground surface. But the alluvial soils are very weak to depths of 10.0m to 12.0m in the southern portion of the site, adjacent to the creek. Approximate extent of deep (more than 10.0m) and very weak alluvial soils is indicated on attached Drawing No 13234/1-AA1. This drawing indicates very week alluvial soils extend to distance of about 50.0m to 75.0m from Narrabeen Creek.
- The depth to bedrock across the site is anticipated to vary from about 5.0m to 20.0m from existing ground surface. The depth to bedrock increases from about 5.0m along the northern boundary to about 20.0m along the southern boundary. In fact the depth to bedrock is anticipated to be more than 15.0m in southern half of the site. Contours showing approximate depths to bedrock, based on information from limited number of boreholes, are indicated on attached Drawing No 13234/1-AA1.

Based on above observations we provide the following assessments:

- The portion of the site with deep and very weak alluvial soils are not suitable as foundation materials unless significant ground improvement works are carried out and/or deep footings founded in bedrock at depths of 15.0mm to 20.0m are considered. Appropriate ground improvement methods may include preloading and/or chemical/cement stabilisation. A detailed investigation, testing and analysis should be completed to provide design recommendations if ground improvement methods are to be implemented.
- The portion of the site with shallow and very weak alluvial soils are assessed to be suitable as foundation materials if some ground improvement works are carried out and/or shallow or deep footings founded in medium dense or better alluvial soils or bedrock at depths of 3.0m to 15.0m from existing ground surface are considered.

The assessments and recommendations presented below in this report are applicable for the portion of the site with shallow weak alluvial soils. However, some discussion is presented about footings in area with deep weak alluvial soils. It is reiterated that a detailed investigation, testing and analysis should be completed to provide design recommendations to improve ground conditions in the portion of the site with deep weak alluvial soils.

Excavation Condition

It is anticipated that the proposed development across the site will involve up to about 3.0m deep excavation. Therefore, materials to be excavated are anticipated to comprise topsoil, fill and alluvial soils. No rock excavation is anticipated. It is our assessment that excavation of topsoil, fill and alluvial soils can be achieved using conventional earthmoving equipment such as excavators and dozers.

Observation during borehole drilling indicated that the depth to groundwater level is likely to be in range of 0.9m to 3.5m from existing ground surface. The depth to groundwater level in the portion of the site with deep weak soils is anticipated to be about 1.0m from existing ground surface and the depth to ground water level in remaining portions of the site is anticipated to be 1.5m or more. Fluctuations in the level of groundwater and/or seepage might occur due to variations in rainfall and/or other factors not observed during field work day. Therefore, 3.0m deep excavation is likely to encounter groundwater inflow. Minor groundwater inflow could be managed by a conventional sump and pump method. However, we suggest that a specialist contractor is engaged to design an appropriate dewatering system if significant groundwater inflow is encountered.

Fill Placement

We anticipate site preparation for the proposed development works and will involve removal of weak alluvial soils and replacement with controlled fill. The following procedures are recommended for placement of controlled fill, where required.

- Strip topsoil and existing fill materials and stockpile separately for possible future uses or dispose off the site. Topsoils may be used in landscaping and fill materials and may be selectively used in controlled fill.

- Strip weak alluvial soils, anticipated to be 1.0m to 3.0m thick and stockpile separately for possible future uses in controlled fill. Observations in boreholes indicated that the depth to groundwater level varies from about 0.9m to 3.5m. Therefore, groundwater inflow might occur during removal of weak alluvial soils and there may be a need for dewatering to ensure groundwater level is at least 300mm lower than the base of weak alluvial soils.
- Undertake proof rolling (using an 8 to 10 tonnes roller) of the exposed alluvial soil, which is anticipated to be medium dense sandy soil, to detect potentially weak spots (ground heave). Excavate areas of localised heaving to depth of about 300mm and replace with crushed sandstone, compacted as described below.
- Undertake proof rolling of soft spots backfilled with crushed sandstone, as described above. If the backfilled area shows movement during further proof rolling, this office should be contacted for further recommendations. The additional works may include dewatering, removal of additional alluvial soils or construction of a Geogrid reinforced bridging layer.
- Place controlled fill over compacted surface of alluvial soil or Geogrid reinforced bridging layer. The controlled fill should comprise at least 0.5m thick crushed sandstone layer overlain by crushed sandstone and/or a mixture of crushed sandstone and sandy soils obtained from excavations within the site. Particle size of crushed sandstone should not exceed 75mm.
- Controlled fill should be placed in horizontal layers of 200mm to 250mm maximum loose thickness and compacted to a Minimum Dry Density Ratio (MDDR) of 98% Standard at moisture content within 2% of Optimum Moisture Content (OMC) for cohesive soils or Minimum Density Index of 75% for sandy soils.
- Fill placement should be supervised to ensure that material quality, layer thickness, testing frequency and compaction criteria conform to the specifications. We recommend "Level 1" supervision, in accordance with Australian Standard AS3798- (Reference 4). It should be noted that a Geotechnical Inspection and Testing Authority will generally provide certification on quality of compacted fill only if Level 1 supervision and testing is carried out.

Batter Slopes and Retaining Structures

It is anticipated that the proposed development works will involve up to about 3.0m deep excavation. As 1.0m to 3.0m thick weak alluvial soils will be removed or replaced with controlled fill, most of excavation is anticipated to occur within medium dense sandy alluvial soils. Some minor fill placement might also be required. Cut and fill slopes during and after development works should be battered for stability or retained by engineered retaining structures. If battering is the preferred option, we recommended the following batter slopes.

- Batter slope for short term stability = 1 vertical to 2 horizontal
- Batter slope for long term stability = 1 vertical to 4 horizontal

Surface protection of the batter slopes can be provided by shotcreting. It is also recommended that batter slopes are provided with adequate surface and sub-surface drainage and the crest of the batter slope is at least 1.5m away from the site boundaries and existing structure, if any.

As the materials in the excavation faces are anticipated to comprise sandy soils, it is unlikely that steep slopes could be maintained in these materials. Furthermore, groundwater level is likely to be encountered during excavation. Therefore, excavation faces may preferably be retained by engineered retaining structures. Appropriate retaining structures for the proposed excavation would comprise contiguous bored pier walls or secant pier walls installed before excavation is commenced or cantilever walls or gravity walls installed after excavation is completed. Secant pile walls will be required if groundwater level is shallower than the base of excavation unless a pumping system is installed to maintain the groundwater level below the base of excavation permanently. The pressure distribution on such walls is assumed to be triangular in shape and estimated as follows:

$$p_h = \gamma k H$$

If the retaining walls are anchored or strutted, the active pressure distribution on such retaining structures is assumed to be rectangular and estimated as follows:

$$p_h = 0.65\gamma k H$$

Where,

p_h = Horizontal active pressure (kN/m^2)
γ = Total density of materials to be retained (say $17.0kN/m^3$)
k = Coefficient of earth pressure (k_a or k_o)
H = Retained height (m)

Distribution of passive pressure, if retaining walls are embedded below the base of excavation, may also be assumed triangular and estimated as follows:

$$p_p = \gamma_1 k_p h$$

Where,

p_p = Horizontal passive pressure (kN/m^2)
γ_1 = Total density of materials below base of excavation (say $18.0kN/m^3$)
k_p = Coefficient of passive earth pressure
h = Wall embedment depth below base of excavation (m)

For design of flexible retaining structures, where some lateral movement is acceptable, an active earth pressure coefficient (k_a=0.45) is recommended. If it is critical to limit the horizontal deformation of a retaining structure, use of an earth pressure coefficient at rest (k_0=0.60) should be considered. To estimate passive resistance, we recommend use of k_p= 2.7. These coefficients are based on the assumption that ground level behind the retaining structure is horizontal and the retained material is effectively drained. Additional earth pressures resulting from surcharge loads (existing structures, traffic etc) and groundwater pressure should also be considered in designing the retaining structures.

We do anticipate base of excavations will be lower than the groundwater level. Therefore, retaining structures are likely to be subjected to groundwater pressure unless a pumping system is installed to maintain the groundwater level below the base of excavation permanently. The groundwater pressure on retaining structures is anticipated to increase linearly from zero at the surface of groundwater level to ten times the depth of water at the base of excavation.

The design of any retaining structure should also be checked for bearing capacity, overturning, sliding and overall stability of the slope.

Floor Slabs and Footings

Floor slabs for the proposed buildings may be designed as suspended slabs supported by footings founded in appropriate foundation materials or ground bearing slabs bearing on controlled fill placed in accordance with the recommendation presented in this report.

For design of floor slabs bearing on controlled fill, we recommend a Modulus of Subgrade Reaction Value of 15kPa/mm.

Exact loadings from the proposed structures are not known at this stage. However, we anticipate that the appropriate footings would comprise shallow footings (pad or strip footings) founded on controlled fill or alluvial soils at depths of less than 2.0m from the base of about 3.0m deep basement excavation and/or deep footings (screw piles, driven piles, bored piers, grout injected piles) founded in alluvial soils at depths exceeding 3.0m from base of basement excavation and bedrock. Deep footings may be preferable if footings are required to withstand lateral and uplift loads. Due to very loose or very soft nature of alluvial soils, we do not recommend that footings are founded at depths less than 3.0m from existing ground surface.

Screw piles, driven piles or grout injected piles would be preferable due to the presence of groundwater at shallow depths, but acceptability of ground vibration during pile driving may determine whether driven piles can be used.

The recommended allowable bearing pressures for design of shallow and deep footings are presented in Table 9.

Table 9 – Recommended Allowable Bearing Pressures

Founding Materials	Founding Depth from Ground Surface* (m)	Depth from Base of 3.0m deep Excavation* (m)	Allowable End Bearing Pressure (kPa)	Allowable Shaft Adhesion (kPa)
Controlled Fill	0.5-1.0	0.0-0.5	100.0	Ignore
Alluvial Soils	3.0-5.0	0.0-2.0	125.0	Ignore
Alluvium Soils	5.0-9.0	2.0-6.0	250.0	5.0
Sandstone – Class V	5.0-20.0	2.0-17.0	900.0	50.0

*Approximate only.

Allowable end bearing pressures presented in Table 10 are for driven piles and screw piles. For bored piers and grout injected piers appropriate values would be halves of those presented in Table 9. Likewise, allowable shaft adhesion values presented in Table 10 are for compressive loads. For uplift loads, allowable shaft adhesion values may be assumed to be halves of those presented in Table 9.

The depths to alluvial soils with recommended allowable bearing pressures could vary across the site and between the boreholes. As is evident in Table 9, the depths to alluvial soils of similar strength and bedrock across the site vary significantly. Therefore, founding level at a specific location will have to be confirmed by an experienced Geotechnical Engineer, on the basis of assessment made during footing excavation or pier hole drilling. The engineer should ensure that the design strength of soil and rock is achieved.

Design of footings (both shallow and deep) should be based on allowable bearing pressures for the foundation materials and acceptable total and differential footing settlements. For shallow footings founded in controlled fill and alluvial soils, total settlement is anticipated to be about 25.0mm. However, for deep footings (screw piles, driven piles, bored piers and grout injected piles piers) of 0.5m to 1.0m diameter, total settlement is estimated to be 10.0mm to 15.0mm. The differential settlements for both shallow and deep footings are estimated to be about halves of the estimated total settlements.

Footings in Portion of Site with Deep Weak Soils

As indicated earlier in this report, the portion of the site with deep and very weak alluvial soils are not suitable as foundation materials unless significant ground improvement works are carried out and/or deep footings founded in bedrock at depths of 15.0mm to 20.0m are considered. A detailed investigation, testing and analysis should be completed to provide design recommendations if ground improvement methods are to be implemented.

However, entire structure may be designed and constructed as suspended structure supported by deep footings founded in sandstone bedrock at depths of 15.0m to 20.0m from existing ground surface. We recommend an allowable bearing pressure of 1000.0kPa for deep footings founded in bedrock. For footings founded in bedrock total settlements under the recommended allowable bearing pressure is estimated to be about 1% of pier diameter or minimum footing dimension. Differential settlement is estimated to be about half the estimated total settlements.

General

Assessments and recommendations presented in this report are based on site observation and information from only eight boreholes distributed across 53 and 53C Warriewood Road, Warriewood. Although we believe that the sub-surface profile presented in this report is indicative of the general profile across the site, it is possible that the sub-surface profile across the site could differ from those encountered in boreholes. Likewise, comments on depth to groundwater level are based observation during field work. Therefore, we recommend that this company is contacted for further advice if actual site conditions encountered during construction differ from those presented in this report.

If you have any questions, please do not hesitate to contact the undersigned.

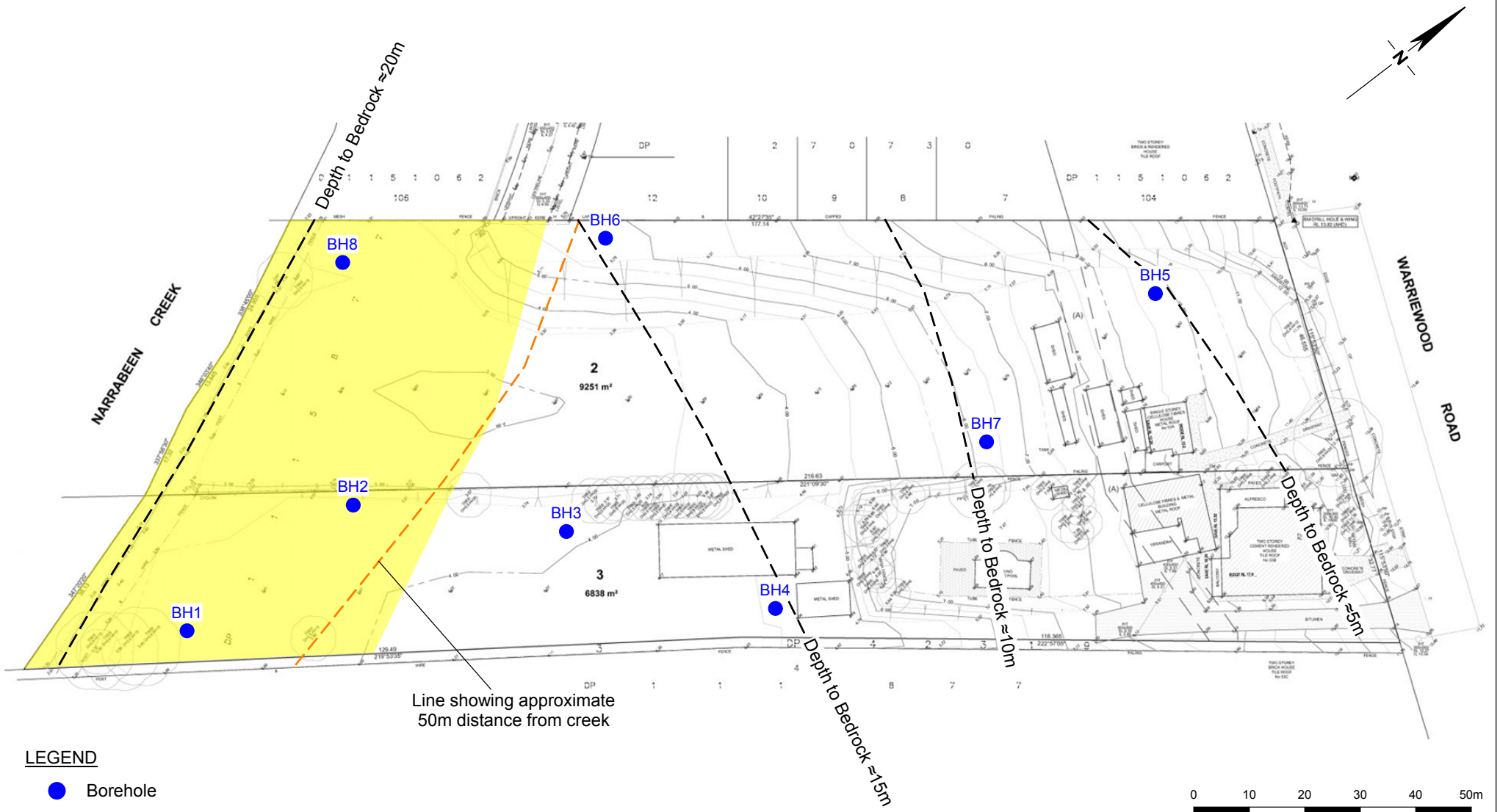
Yours faithfully
GEOTECHNIQUE PTY LTD

INDRA JWORCHAN
Principal Geotechnical Engineer

Attached Drawing No 13234/1-AA1 – Borehole Location Plan
Borehole Logs & Explanatory Notes
Laboratory Test Results

References

1. Lillicrap, A and McGhie, S., Site Investigation for Urban Salinity, Department of Land and Water Conservation, 2002.
2. Standard Australia- AS2159-1995, Piling – Design and Installation, 1995.
3. New South Wales, Acid sulphate Soil Management Advisory Committee, 1988 – Acid sulphate Soil Manual.
4. Australian Standard AS3798-2007, Guidelines on Earthworks for Commercial and Residential Developments, 2007.



LEGEND

- Borehole
- Area with very loose or very soft soil to 10-15m deep

0 10 20 30 40 50m

Scale 1:1000

GEOTECHNIQUE® PTY LTD

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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Intercapital Consultants
Proposed Residential Development
Lots 2,3, & 4 in DP111587 and Lot 3 in DP942319
53R Warriewood Road, Warriewood

Borehole Locations

Drawing No: 13234/1-AA1
Job No: 13234/1
Drawn By: MH
Date: 18 August 2014
Checked By: IJ

File No: 13234-1
Layers: 0, AA1

GEOTECHNIQUE
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engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 1
Date : 25/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅3.01

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			FILL; Silty Clayey Sand, fine grained, brown				
								SM	Silty SAND, fine to medium grained, brown yellow	M	L		Alluvial
		ES			N=5 3,3,2	1							
	▼							SM	Silty SAND, fine to coarse grained, dark brown	M	VL		Groundwater at 1.2m
		ES			N=1 0,1,0			SM	Silty Clayey SAND, fine to medium grained, dark brown	W	VL		
						2							
					N=0 0,0,0	3		SM	Silty SAND, fine to medium grained, dark brown	W	VL		
						4							
					N=3 0,2,1			SM	Silty SAND, fine to coarse grained, dark brown	W	VL		
						5							
					N=0 0,0,0	6		CI	Silty Sandy CLAY, medium plasticity, dark brown	M>PL	VS		
						7							
					N=7 0,3,4								
						8							
					N=0 0,0,0	9		CI	Silty CLAY, medium plasticity, brown	M>PL	VS		

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 1
Date : 25/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅3.01

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						10							
					N=5 3,2,3			SM	Silty Clayey SAND, fine to medium grained	W	L		
						11							
					N=11 3,6,5	12		SM	Silty SAND, fine to medium grained, grey	W	MD		
						13							
						14							
					N=38 10,17,21	15		SM	Silty SAND, fine to medium grained, grey, with some fine grained gravel	W	VD		
						16							
						17		SM	Silty SAND, fine to coarse grained, grey, with some fine grained gravel	W	VD		Getting harder to drill
						18							
						19			Borehole No 1 terminated at 18.5m				

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engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 2
Date : 25/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅3.97

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
	▼				N=2 1,1,1	0		SM	FILL; Silty Clayey Sand, fine to medium grained, brown, with some gravel and sandstone	M	VL		Alluvial
						1			Silty SAND, fine to medium grained, brown to dark brown				Groundwater at 0.9m
						2		SM	Silty Clayey SAND, fine to medium grained	W	VL		
					N=0 0,0,0	3		CI	Silty Sandy CLAY, medium plasticity, grey	M>PL	VS		
					N=0 0,0,0	6		SM	Silty SAND, fine to medium grained, brown	W	VL		
					N=14 1,6,8	9		SM	Silty SAND, fine to medium grained, dark brown	W	MD		

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engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 2
Date : 25/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅3.97

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						10							
						11							
						12							
					N=23 5,10,13			SM	Silty SAND, fine to medium grained, dark brown	W	MD		
						13							
						14							
						15		SM	Silty SAND, fine to medium grained, dark brown to grey	W	MD		
					N=16 12,10,6								
									Borehole No 2 terminated at 15.45m				
						16							
						17							
						18							
						19							

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engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 3
Date : 28/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅4.0

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			FILL; Silty Clayey Sand, fine to medium grained, brown, red, with some concrete cobbles and gravel				
								SM	Silty Clayey SAND, fine to medium grained, dark brown	M	L		Alluvial
	▼				N=6 3,2,4	1							Groundwater at 1.4m
						2		SM	Silty SAND, fine to medium grained, grey to light grey	W	MD		
					N=15 4,7,8	3							
						4							
						5							
					N=29 2,7,22	6		SM	Silty Clayey SAND, fine to medium grained, grey, with some medium plasticity fines	W	MD		Slight resistance at 7.2m (200mm)
						7							
						8		Cl	Silty Sandy CLAY, medium plasticity, grey	M>PL	VSt		
					N=11 6,6,5	9							

GEOTECHNIQUE
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engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 3
Date : 28/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅4.0

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						10		SM	Silty Clayey SAND, fine to medium grained, grey	W	MD		
					N=9 2,4,5	11							
						12							
						13							
						14							
					N=10 4,4,6	15		SM	Silty SAND, fine to medium grained, dark brown	W	MD		
									Borehole No 3 terminated at 15.45m				
						16							
						17							
						18							
						19							

GEOTECHNIQUE
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engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 4
Date : 28/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅4.04

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
	▼					0			FILL; Silty Sand, fine to medium grained, brown, with gravel				
								SM	Silty SAND, fine grained, dark brown	M	VL		Groundwater at 0.8m
					N=0 0,0,0	1							
						2		SM	Silty SAND, fine to medium grained, grey	W	L		Alluvial
					N=21 7,10,11	3		SM	Silty SAND, fine to medium grained, grey	W	MD		Getting hard at 3.7m
						4							
						5							
					N=12 3,5,7	6		SM	Silty Clayey SAND, fine to medium grained, grey	W	MD		
						7							
						8							
					N=9 2,4,5	9		SM	Silty Clayey SAND, fine to medium grained, light grey	W	MD		

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engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 4
Date : 28/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅4.04

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						10							
						11							Getting harder at 11.7m
					N=6 2,3,3	12		SM	Silty Clayey SAND, fine to medium grained, grey to red	W	L		
						13		SM	Silty Clayey SAND, fine to medium grained, reddish grey, with some ironstone	W	VD		
					N=34 4,12,22	14							
						15							
									Borehole No 4 terminated at 15.45m				
						16							
						17							
						18							
						19							

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 5
Date : 28/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅9.5

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			TOPSOIL; Silty Sand, fine to medium grained, dark brown, with roots				
		ES						SM	Silty Clayey SAND, fine to medium grained, orange to yellow	M	MD		Residual
					N=15 5,7,8	1							
						2		SM	Silty Clayey SAND, fine to medium grained, red orange, with some medium plasticity clay	M	MD		
					N=20 7,9,11	3		SM	Silty Clayey SAND, fine to medium grained, red grey to pink, with some ironstone	M	MD		
						4							
						5							
					N=R 5,10,20/ 50	6		SM	Silty Clayey SAND, fine to medium grained, grey, with red ironstone and extremely weathered sandstone	M	VD		
	Dry												Bedrock
									SANDSTONE, extremely to distinctly weathered, fine to medium grained, red grey, with ironstone				
						7			Borehole No 5 terminated at 6.5m				
						8							
						9							

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 6
Date : 29/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅6.75

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			FILL; Silty Sandy Clay, medium plasticity, grey brown, with some sandstone and gravel				
					N=16 5,9,7	1							
						2		SM	Silty Clayey SAND, fine to medium grained, grey	M	MD		Residual
	▼				N=9 2,3,6	3		Cl	Silty Sandy CLAY, medium plasticity, grey brown	M<PL	St		Groundwater at 3.5m
						4		SM	Silty SAND, fine to medium grained, grey	W	MD		
						5							
					N=15 6,7,8	6		SM	Silty SAND, fine to medium grained, grey	W	MD		
						7							
						8							
					N=9 2,3,6	9		SM	Silty Clayey SAND, fine to medium grained, grey	W	L		

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 6
Date : 29/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅6.75

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						10		SM	Silty Clayey SAND, fine to medium grained, reddish brown to pink	W	MD		
					N=23 5,10,13	12		SM	Silty Clayey SAND, fine to medium grained, red grey, with some ironstone	W	MD		
						14		SM	Silty Clayey SAND, fine to medium grained, reddish pink, with some ironstone	W	MD		
									SANDSTONE, extremely weathered, grey to reddish grey to pink, with some ironstone				Bedrock
						15			Borehole No 6 terminated at 14.8m				
						16							
						17							
						18							
						19							

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 7
Date : 29/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅6.5

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			TOPSOIL; Clayey Silt, low plasticity, dark brown, with grass roots				
								SM	Silty SAND, fine to medium grained, grey brown to red	M	MD		Residual (Distinct smell) from septic tank
		ES											
	▼				N=10 3,5,5	1							Groundwater at 1.5m
						2		SM	Silty Clayey SAND, fine to medium grained, grey brown	W	MD		
						3		SM	Silty SAND, fine to medium grained, grey	W	MD		
					N=18 5,8,10								
						4		SM	Silty Clayey SAND, fine to medium grained, reddish grey to pink	W	MD		
						5							
						6		SM	Silty Clayey Sand, fine to medium grained, pink grey, with some ironstone	W	MD		
					N=26 6,10,16								
						7							
						8							
						9		CI	Silty Sandy CLAY, medium plasticity, grey to pink, with ironstone	M>PL	H		
					N=43 8,18,25								

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 7
Date : 29/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅6.5

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						10							
									SANDSTONE, extremely weathered, grey pink, with some ironstone				Bedrock
						11			Borehole No 7 terminated at 10.7m				
						12							
						13							
						14							
						15							
						16							
						17							
						18							
						19							

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 8
Date : 29/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅3.05

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			TOPSOIL; Silty Clayey Sand, fine to medium grained, dark brown				
	▼	ES											
						1		CI	Silty Sandy CLAY, medium plasticity, grey brown	M>PL	F		Alluvial Groundwater at 1.0m
		ES				2							
								SM	Silty SAND, fine to medium grained, grey	W	MD		
					N=13 3,7,6	3							
						4							
						5							
						6		SM	Silty SAND, fine to medium grained, dark brown	W	VL		
					N=1 0,1,0								
						7							
						8							Getting harder
						9		SM	Silty SAND, fine to medium grained, grey	W	MD		
					N=10 2,4,6								

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 8
Date : 29/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅3.05

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						10							
						11							
								SM	Silty SAND, fine to coarse grained, grey, with some fine grained gravel	W	VD		
					N=63 34,24,39	12							
						13							
						14		SM	Silty SAND, fine to coarse grained, grey, with some fine grained gravel	W	VD		
						15							
						16							
						17		SM	Silty SAND, fine to coarse grained, grey, with fine grained gravel	W	VD		
						18							
						19							
									SANDSTONE, extremely to slightly weathered, grey				Bedrock

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : Intercapital Consultants
Project : Proposed Residential Developments
Location : 53 & 53C Warriewood Road, Warriewood

Job No. : 13234/1
Borehole No. : 8
Date : 29/07/2014
Logged/Checked by: MT/IJ

drill model and mounting : Kommachio Track Mounted **slope :** **deg.** **R.L. surface :** ≅3.05

hole diameter : 100 **mm** **bearing :** **deg.** **datum :**

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						20			Borehole No 8 terminated at 19.5m				
						21							
						22							
						23							
						24							
						25							
						26							
						27							
						28							
						29							

EXPLANATORY NOTES

Introduction
These notes have been provided to simplify the geotechnical report with regard to investigation procedures, classification methods and certain matters relating to the Discussion and Comments section. Not all notes are necessarily relevant to all reports.

Geotechnical reports are based on information gained from finite sub-surface probing, excavation, boring, sampling or other means of investigation, supplemented by experience and knowledge of local geology. For this reason they must be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods
The methods of description and classification of soils and rocks used in this report are based on AS1726 - 1993 "Geotechnical Site Investigations". In general, descriptions cover the following properties; strength or density, colour, structure, soil or rock type, and inclusions. Identification and classification of soil and rock involves, to a large extent, judgement within the acceptable level commonly adopted by current geotechnical practices.

Soil types are described according to the predominating particle size, qualified by the grading or other particles present (e.g. sandy clay) on the following basis:

Soil Classification	Particle Size
Clay	Less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2.00mm
Gravel	2.00mm to 60.00mm

Cohesive soils are classified on the basis of strength, either by laboratory testing or engineering examination. The strength terms are defined as follows:

Classification	Undrained Shear Strength kPa
Very Soft	Less than 12
Soft	12 – 25
Firm	25 – 50
Stiff	50 – 100
Very Stiff	100 – 200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT), as below:

Relative Density	SPT 'N' Value (blows/300mm)	CPT Cone Value (q_c-MPQ)
Very Loose	Less than 5	Less than 2
Loose	5 – 10	2 – 5
Medium Dense	10 – 30	5 – 15
Dense	30 – 50	15 – 25
Very Dense	>50	>25

Rock types are classified by their geological names, together with descriptive terms on degrees of weathering, strength, defects and other minor components. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling
Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, type, moisture content, inclusions and depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin walled sample tube (normally known as U_{50}) into the soil and withdrawing a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils. Details of the type and method of sampling are given in the report.

Field Investigation Methods
The following is a brief summary of investigation methods currently carried out by this Company and comments on their use and application.

Hand Auger Drilling
The borehole is advanced by manually operated equipment. The diameter of the borehole ranges from 50mm to 100mm. Penetration depth of hand augered boreholes may be limited by premature refusal on a variety of materials, such as hard clay, gravels or ironstone.

Test Pits
These are excavated with a tractor-mounted backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3.0m for a backhoe and up to 6.0m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Care must be taken if construction is to be carried out near, or within the test pit locations, to either adequately recompact the backfill during construction, or to design the structure to accommodate the poorly compacted backfill.

Large Diameter Auger (e.g. Pengo)
The hole is advanced by a rotating plate or short spiral auger, generally 300mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5m) and are disturbed, but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers and is usually supplemented by occasional undisturbed tube sampling.

Continuous Spiral Flight Augers
The hole is advanced by using 90mm-115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling or insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be highly mixed with soil of other stratum.

Information from the drilling (as distinct from specific sampling by SPT or undisturbed samples) is of relatively lower reliability due to remoulding, mixing or softening of samples by groundwater, resulting in uncertainties of the original sample depth.

The spiral augers are usually advanced by using a V-bit through the soil profile to refusal, followed by Tungsten Carbide (TC) bit, to penetrate into bedrock. The quality and continuity of the bedrock may be assessed by examination of recovered rock fragments and through observation of the drilling penetration resistance.

Non-core Rotary Drilling (Wash Boring)
The hole is advanced by a rotary bit, with water being pumped down the drill rod and returned up the annulus carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the feel and rate of penetration.

Rotary Mud Stabilised Drilling
This is similar to rotary drilling, but uses drilling mud as a circulating fluid, which may consist of a range of products from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (e.g. SPT and U_{50}) samples).

Continuous Core Drilling
A continuous core sample is obtained using a diamond tipped core barrel. Providing full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush.

Portable Proline Drilling
This is manually operated equipment and is only used in sites which require bedrock core sampling and there is restricted site access to truck mounted drill rigs. The boreholes are usually advanced initially using a tricone roller bit and water circulation to penetrate the upper soil profile. In some instances, a hand auger may be used to penetrate the soil profile. Subsequent drilling into bedrock involves the use of NMLC triple tube equipment, using water as a lubricant.

Standard Penetration Tests
Standard penetration tests are used mainly in non-cohesive soils, but occasionally also in cohesive soils, as a means of determining density or strength and of obtaining a relatively undisturbed sample. The test procedure is described in AS1289 6.3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube under the impact of a 63kg hammer with a free fall of 769mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In a case where full penetration is obtained with successive blow counts for each 150mm of, say 4, 6 and 7 blows as;

  N = 13
  4,6,7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm as;

  15, 30/40mm

The results of the tests can be related empirically to the engineering properties of the soil. Occasionally the test method is used to obtain samples in 50mm diameter thin walled sample tubes in clays. In these circumstances, the test results are shown on the bore logs in brackets.

Cone Penetrometer Testing and Interpretation
Cone penetrometer testing (sometimes referred to as Dutch Cone-CPT) described in this report, has been carried out using an electrical friction cone penetrometer and the test is described in AS1289 6.5.1.

In the test, a 35mm diameter rod with cone tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig, which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output on continuous chart recorders. The plotted results given in this report have been traced from the original records. The information provided on the charts comprises:

- Cone resistance - the actual end bearing force divided by the cross sectional area of the cone, expressed in MPa *
- Sleeve friction - the frictional force on the sleeve divided by the surface area, expressed in kPa

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and very soft clays, rising to 4% to 10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:

$$q_c \text{ (MPa)} = (0.4 \text{ to } 0.6)\ N \text{ (blows per 300mm)}$$

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:

$$q_c=(12 \text{ to } 18)C_u$$

Interpretation of CPT values can also be made to allow estimate of modulus or compressibility values, to allow calculation of foundation settlements. Inferred stratification, as shown on the attached report, is assessed from the cone and friction traces, from experience and information from nearby boreholes etc.

This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties and where precise information or soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometer (DCP)
Portable Dynamic Cone Penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows per successive 100mm increment of penetration.

There are two similar tests, Cone Penetrometer (commonly known as Scala Penetrometer) AS1289 6.3.2 and the Perth Sand Penetrometer AS1289 6.3.3. Scala Penetrometer is commonly adopted by this company and consists of a 16mm rod with a 20mm diameter cone end, driven with a 9kg hammer, dropping 510mm (AS1289 Test P3.2).

Laboratory Testing
Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedures are given on the individual report forms.

Engineering Logs
The engineering logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, however, this is not always practicable or possible to justify economically. As it is, the boreholes represent only a small sample of the total sub-surface profile. Interpretation of the information and its application to design and construction should take into account the spacing of boreholes, frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Groundwater
Where groundwater levels are measured in boreholes, there are several potential problems:

- in low permeability soils groundwater, although present, may enter the hole slowly or perhaps not at all during the investigation period
- a localised perched water table may lead to an erroneous indication of the true water table
- water table levels will vary from time to time due to the seasons or recent weather changes. They may not be the same at the time of construction as indicated in the report
- the use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole if water observations are to be made

More reliable measurements can be achieved by installing standpipes that are read at intervals over several days, or weeks for low permeability soils. Piezometers sealed in a particular stratum may be advisable in low permeability soils, or where there may be interference from a perched water table or surface water.

Engineering Reports
Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, perhaps a three-storey building, the information and interpretation may not be relevant if the design proposal is changed, say to a twenty-storey building. If this occurs, the Company will be pleased to review the report and sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of sub-surface conditions, discussions of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on bore spacing and sampling frequency.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies
In the event that conditions encountered on-site during construction appear to vary from those that were expected from the information contained in the report, the Company requests immediate notification. Most problems are much more easily resolved when conditions are exposed rather than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes
Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institute of Engineers Australia. Where information obtained from this Investigation is provided for tendering purposes; it is recommended that all information, including the written report and discussion, be made available.

In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or make additional copies of the report available for contract purposes, at a nominal charge.

Site Inspection
The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that the conditions exposed are as expected, to full time engineering presence on site.

Review of Design
Where major civil or structural developments are proposed, or where only a limited investigation has been completed, or where the geotechnical conditions are complex, it is prudent to have the design reviewed by a Senior Geotechnical Engineer.

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	Indra Jworchan
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	indra.jworchan@geotech.com.au
Project	**13234-1- 53C Warriewood Rd, Warriewood**
Order Number	(Not specified)
Samples	45
Date Received	30/7/2014

LABORATORY DETAILS

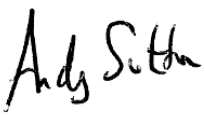
Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE130132 R0**
Report Number	0000088691
Date Reported	7/8/2014
Date Started	1/8/2014

COMMENTS

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

SPOCAS and Cr reducible suite subcontracted to SGS Cairns, 2/58 Comport St, Portsmith QLD 4870, NATA Accreditation Number: 2562, Site Number: 3146.

SIGNATORIES



Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Sheila Lepasana
Senior Technician

pH in soil (1:2) [AN101]

PARAMETER	UOM	LOR	BH1 0.5-0.95 SOIL 30/7/2014 SE130132.001	BH1 1.5-1.95 SOIL 30/7/2014 SE130132.004	BH1 3.0-3.45 SOIL 30/7/2014 SE130132.005	BH1 4.5-4.95 SOIL 30/7/2014 SE130132.006	BH1 7.5-7.95 SOIL 30/7/2014 SE130132.007	BH1 6.0-6.45 SOIL 30/7/2014 SE130132.008
pH (1:2)	pH Units	-	7.2	5.3	5.5	5.4	6.4	6.9

PARAMETER	UOM	LOR	BH1 9.0-9.45 SOIL 30/7/2014 SE130132.009	BH1 10.5-10.95 SOIL 30/7/2014 SE130132.010	BH1 15.0-15.45 SOIL 30/7/2014 SE130132.011	BH5 1.0-1.45 SOIL 30/7/2014 SE130132.028	BH5 3.0-3.45 SOIL 30/7/2014 SE130132.029	BH5 6.0-6.45 SOIL 30/7/2014 SE130132.030
pH (1:2)	pH Units	-	6.6	6.6	5.6	4.2	3.7	3.9

PARAMETER	UOM	LOR	BH6_12.0-12.45 SOIL 30/7/2014 SE130132.041
pH (1:2)	pH Units	-	4.4

Conductivity (1:2) in soil [AN106]

PARAMETER	UOM	LOR	BH1 0.5-0.95 SOIL 30/7/2014 SE130132.001	BH1 1.5-1.95 SOIL 30/7/2014 SE130132.004	BH1 3.0-3.45 SOIL 30/7/2014 SE130132.005	BH1 4.5-4.95 SOIL 30/7/2014 SE130132.006	BH1 7.5-7.95 SOIL 30/7/2014 SE130132.007	BH1 6.0-6.45 SOIL 30/7/2014 SE130132.008
Conductivity (1:2) @25 C*	µS/cm	1.0	180	170	78	66	240	840
Resistivity (1:2)*	ohm cm	-	5500	5800	13000	15000	4100	1200

PARAMETER	UOM	LOR	BH1 9.0-9.45 SOIL 30/7/2014 SE130132.009	BH1 10.5-10.95 SOIL 30/7/2014 SE130132.010	BH1 15.0-15.45 SOIL 30/7/2014 SE130132.011	BH5 1.0-1.45 SOIL 30/7/2014 SE130132.028	BH5 3.0-3.45 SOIL 30/7/2014 SE130132.029	BH5 6.0-6.45 SOIL 30/7/2014 SE130132.030
Conductivity (1:2) @25 C*	µS/cm	1.0	220	93	56	57	62	100
Resistivity (1:2)*	ohm cm	-	4700	11000	18000	18000	16000	9900

PARAMETER	UOM	LOR	BH6_12.0-12.45 SOIL 30/7/2014 SE130132.041
Conductivity (1:2) @25 C*	µS/cm	1.0	140
Resistivity (1:2)*	ohm cm	-	7200

Conductivity and TDS by Calculation - Soil [AN106]

PARAMETER	UOM	LOR	BH1 0.5-0.95 SOIL 30/7/2014 SE130132.001	BH1 1.5-1.95 SOIL 30/7/2014 SE130132.004	BH1 3.0-3.45 SOIL 30/7/2014 SE130132.005	BH1 4.5-4.95 SOIL 30/7/2014 SE130132.006	BH1 7.5-7.95 SOIL 30/7/2014 SE130132.007	BH1 6.0-6.45 SOIL 30/7/2014 SE130132.008
Conductivity of Extract (1:5 dry	µS/cm	1.0	86	75	56	33	130	780

PARAMETER	UOM	LOR	BH1 9.0-9.45 SOIL 30/7/2014 SE130132.009	BH1 10.5-10.95 SOIL 30/7/2014 SE130132.010	BH1 15.0-15.45 SOIL 30/7/2014 SE130132.011	BH2 1.0-1.45 SOIL 30/7/2014 SE130132.012	BH2 3.0-3.45 SOIL 30/7/2014 SE130132.013	BH2 6.0-6.45 SOIL 30/7/2014 SE130132.014
Conductivity of Extract (1:5 dry	µS/cm	1.0	95	41	40	30	100	220

PARAMETER	UOM	LOR	BH2 9.0-9.45 SOIL 30/7/2014 SE130132.015	BH2 12.0-12.45 SOIL 30/7/2014 SE130132.016	BH2 15.0-15.45 SOIL 30/7/2014 SE130132.017	BH3 1.0-1.45 SOIL 30/7/2014 SE130132.018	BH3 3.0-3.45 SOIL 30/7/2014 SE130132.019	BH3 6.0-6.45 SOIL 30/7/2014 SE130132.020
Conductivity of Extract (1:5 dry	µS/cm	1.0	130	63	59	69	76	120

PARAMETER	UOM	LOR	BH3 9.0-9.45 SOIL 30/7/2014 SE130132.021	BH3 12.0-12.45 SOIL 30/7/2014 SE130132.022	BH3 15.0-15.45 SOIL 30/7/2014 SE130132.023	BH4 1.0-1.45 SOIL 30/7/2014 SE130132.024	BH4 3.0-3.45 SOIL 30/7/2014 SE130132.025	BH4 6.0-6.45 SOIL 30/7/2014 SE130132.026
Conductivity of Extract (1:5 dry	µS/cm	1.0	71	53	110	45	50	110

PARAMETER	UOM	LOR	BH5 1.0-1.45 SOIL 30/7/2014 SE130132.028	BH5 3.0-3.45 SOIL 30/7/2014 SE130132.029	BH5 6.0-6.45 SOIL 30/7/2014 SE130132.030	BH6 1.0-1.45 SOIL 30/7/2014 SE130132.031	BH6 3.0-3.45 SOIL 30/7/2014 SE130132.032	BH6 6.0-6.45 SOIL 30/7/2014 SE130132.033
Conductivity of Extract (1:5 dry	µS/cm	1.0	57	54	80	140	82	70

PARAMETER	UOM	LOR	BH7 1.0-1.45 SOIL 30/7/2014 SE130132.035	BH7 3.0-3.45 SOIL 30/7/2014 SE130132.036	BH7 6.0-6.45 SOIL 30/7/2014 SE130132.037	BH7 9.0-9.45 SOIL 30/7/2014 SE130132.038	BH8 0.5-1.0 SOIL 30/7/2014 SE130132.039	BH6_12.0-12.45 SOIL 30/7/2014 SE130132.041
Conductivity of Extract (1:5 dry	µS/cm	1.0	75	72	110	73	80	120

PARAMETER	UOM	LOR	BH8 3.0-3.45 SOIL 30/7/2014 SE130132.042	BH8 6.0-6.45 SOIL 30/7/2014 SE130132.043	BH8 9.0-9.45 SOIL 30/7/2014 SE130132.044	BH8 12.0-12.45 SOIL 30/7/2014 SE130132.045
Conductivity of Extract (1:5 dry	µS/cm	1.0	60	62	30	33

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography [AN245]

PARAMETER	UOM	LOR	BH1 0.5-0.95 SOIL 30/7/2014 SE130132.001	BH1 1.5-1.95 SOIL 30/7/2014 SE130132.004	BH1 3.0-3.45 SOIL 30/7/2014 SE130132.005	BH1 4.5-4.95 SOIL 30/7/2014 SE130132.006	BH1 7.5-7.95 SOIL 30/7/2014 SE130132.007	BH1 6.0-6.45 SOIL 30/7/2014 SE130132.008
Chloride	mg/kg	0.250	4.3	21	26	21	16	35
Sulphate	mg/kg	0.50	8.7	56	4.0	6.3	110	630

PARAMETER	UOM	LOR	BH1 9.0-9.45 SOIL 30/7/2014 SE130132.009	BH1 10.5-10.95 SOIL 30/7/2014 SE130132.010	BH1 15.0-15.45 SOIL 30/7/2014 SE130132.011	BH5 1.0-1.45 SOIL 30/7/2014 SE130132.028	BH5 3.0-3.45 SOIL 30/7/2014 SE130132.029	BH5 6.0-6.45 SOIL 30/7/2014 SE130132.030
Chloride	mg/kg	0.250	22	16	7.4	5.9	4.5	20
Sulphate	mg/kg	0.50	25	16	23	46	57	70

PARAMETER	UOM	LOR	BH6_12.0-12.45 SOIL 30/7/2014 SE130132.041
Chloride	mg/kg	0.250	140
Sulphate	mg/kg	0.50	41

Moisture Content [AN002]

PARAMETER	UOM	LOR	BH1 0.5-0.95 SOIL 30/7/2014 SE130132.001	BH1 1.5-1.95 SOIL 30/7/2014 SE130132.004	BH1 3.0-3.45 SOIL 30/7/2014 SE130132.005	BH1 4.5-4.95 SOIL 30/7/2014 SE130132.006	BH1 7.5-7.95 SOIL 30/7/2014 SE130132.007	BH1 6.0-6.45 SOIL 30/7/2014 SE130132.008
% Moisture	%	0.50	16	31	27	17	17	36

PARAMETER	UOM	LOR	BH1 9.0-9.45 SOIL 30/7/2014 SE130132.009	BH1 10.5-10.95 SOIL 30/7/2014 SE130132.010	BH1 15.0-15.45 SOIL 30/7/2014 SE130132.011	BH2 1.0-1.45 SOIL 30/7/2014 SE130132.012	BH2 3.0-3.45 SOIL 30/7/2014 SE130132.013	BH2 6.0-6.45 SOIL 30/7/2014 SE130132.014
% Moisture	%	0.50	27	19	17	17	31	21

PARAMETER	UOM	LOR	BH2 9.0-9.45 SOIL 30/7/2014 SE130132.015	BH2 12.0-12.45 SOIL 30/7/2014 SE130132.016	BH2 15.0-15.45 SOIL 30/7/2014 SE130132.017	BH3 1.0-1.45 SOIL 30/7/2014 SE130132.018	BH3 3.0-3.45 SOIL 30/7/2014 SE130132.019	BH3 6.0-6.45 SOIL 30/7/2014 SE130132.020
% Moisture	%	0.50	23	13	17	17	20	28

PARAMETER	UOM	LOR	BH3 9.0-9.45 SOIL 30/7/2014 SE130132.021	BH3 12.0-12.45 SOIL 30/7/2014 SE130132.022	BH3 15.0-15.45 SOIL 30/7/2014 SE130132.023	BH4 1.0-1.45 SOIL 30/7/2014 SE130132.024	BH4 3.0-3.45 SOIL 30/7/2014 SE130132.025	BH4 6.0-6.45 SOIL 30/7/2014 SE130132.026
% Moisture	%	0.50	18	16	28	18	17	16

PARAMETER	UOM	LOR	BH5 1.0-1.45 SOIL 30/7/2014 SE130132.028	BH5 3.0-3.45 SOIL 30/7/2014 SE130132.029	BH5 6.0-6.45 SOIL 30/7/2014 SE130132.030	BH6 1.0-1.45 SOIL 30/7/2014 SE130132.031	BH6 3.0-3.45 SOIL 30/7/2014 SE130132.032	BH6 6.0-6.45 SOIL 30/7/2014 SE130132.033
% Moisture	%	0.50	18	16	15	12	13	15

PARAMETER	UOM	LOR	BH7 1.0-1.45 SOIL 30/7/2014 SE130132.035	BH7 3.0-3.45 SOIL 30/7/2014 SE130132.036	BH7 6.0-6.45 SOIL 30/7/2014 SE130132.037	BH7 9.0-9.45 SOIL 30/7/2014 SE130132.038	BH8 0.5-1.0 SOIL 30/7/2014 SE130132.039	BH6_12.0-12.45 SOIL 30/7/2014 SE130132.041
% Moisture	%	0.50	17	15	18	17	21	15

PARAMETER	UOM	LOR	BH8 3.0-3.45 SOIL 30/7/2014 SE130132.042	BH8 6.0-6.45 SOIL 30/7/2014 SE130132.043	BH8 9.0-9.45 SOIL 30/7/2014 SE130132.044	BH8 12.0-12.45 SOIL 30/7/2014 SE130132.045
% Moisture	%	0.50	17	20	13	17

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.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:2 and the pH determined and reported on the extract after 1 hour extraction (pH 1:2) or after 1 hour extraction and overnight aging (pH (1:2) aged). Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2520 B.
AN245	Anions by Ion Chromatography: A water sample or extract is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

*	Analysis not covered by the scope of accreditation.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
^	Performed by outside laboratory.	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.

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

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.pv.sgsv3/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE130132 R0

CLIENT DETAILS

Contact	Indra Jworchan
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	indra.jworchan@geotech.com.au
Project	**13234-1- 53C Warriewood Rd, Warriewood**
Order Number	(Not specified)
Samples	45

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
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Telephone	+61 2 8594 0400
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Email	au.environmental.sydney@sgs.com
SGS Reference	SE130132 R0
Report Number	0000088692
Date Reported	07 Aug 2014

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' 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:

Analysis Date	Conductivity and TDS by Calculation - Soil	35 items

SAMPLE SUMMARY

Sample counts by matrix	45 Soils	Type of documentation received	COC
Date documentation received	30/07/2014@11:53a	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	4.0°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE130132 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.

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.5-0.95	SE130132.001	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 1.5-1.95	SE130132.004	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 3.0-3.45	SE130132.005	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 4.5-4.95	SE130132.006	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 7.5-7.95	SE130132.007	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 6.0-6.45	SE130132.008	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 9.0-9.45	SE130132.009	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 10.5-10.95	SE130132.010	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH1 15.0-15.45	SE130132.011	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH5 1.0-1.45	SE130132.028	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH5 3.0-3.45	SE130132.029	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH5 6.0-6.45	SE130132.030	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH6_12.0-12.45	SE130132.041	LB061948	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.5-0.95	SE130132.001	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 1.5-1.95	SE130132.004	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 3.0-3.45	SE130132.005	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 4.5-4.95	SE130132.006	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 7.5-7.95	SE130132.007	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 6.0-6.45	SE130132.008	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 9.0-9.45	SE130132.009	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 10.5-10.95	SE130132.010	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH1 15.0-15.45	SE130132.011	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH2 1.0-1.45	SE130132.012	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH2 3.0-3.45	SE130132.013	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH2 6.0-6.45	SE130132.014	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH2 9.0-9.45	SE130132.015	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH2 12.0-12.45	SE130132.016	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH2 15.0-15.45	SE130132.017	LB061944	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	06 Aug 2014	07 Aug 2014†
BH3 1.0-1.45	SE130132.018	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH3 3.0-3.45	SE130132.019	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH3 6.0-6.45	SE130132.020	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH3 9.0-9.45	SE130132.021	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH3 12.0-12.45	SE130132.022	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH3 15.0-15.45	SE130132.023	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH4 1.0-1.45	SE130132.024	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH4 3.0-3.45	SE130132.025	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH4 6.0-6.45	SE130132.026	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH5 1.0-1.45	SE130132.028	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH5 3.0-3.45	SE130132.029	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH5 6.0-6.45	SE130132.030	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH6 1.0-1.45	SE130132.031	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH6 3.0-3.45	SE130132.032	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH6 6.0-6.45	SE130132.033	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH7 1.0-1.45	SE130132.035	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH7 3.0-3.45	SE130132.036	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH7 6.0-6.45	SE130132.037	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH7 9.0-9.45	SE130132.038	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH8 0.5-1.0	SE130132.039	LB061945	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014†
BH6_12.0-12.45	SE130132.041	LB061946	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH8 3.0-3.45	SE130132.042	LB061946	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH8 6.0-6.45	SE130132.043	LB061946	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH8 9.0-9.45	SE130132.044	LB061946	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014
BH8 12.0-12.45	SE130132.045	LB061946	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014	06 Aug 2014

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.5-0.95	SE130132.001	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH1 1.5-1.95	SE130132.004	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014

HOLDING TIME SUMMARY

SE130132 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
BH1 3.0-3.45	SE130132.005	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH1 4.5-4.95	SE130132.006	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH1 7.5-7.95	SE130132.007	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH1 6.0-6.45	SE130132.008	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH1 9.0-9.45	SE130132.009	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH1 10.5-10.95	SE130132.010	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH1 15.0-15.45	SE130132.011	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH2 1.0-1.45	SE130132.012	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH2 3.0-3.45	SE130132.013	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH2 6.0-6.45	SE130132.014	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH2 9.0-9.45	SE130132.015	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH2 12.0-12.45	SE130132.016	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH2 15.0-15.45	SE130132.017	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH3 1.0-1.45	SE130132.018	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH3 3.0-3.45	SE130132.019	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH3 6.0-6.45	SE130132.020	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH3 9.0-9.45	SE130132.021	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH3 12.0-12.45	SE130132.022	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH3 15.0-15.45	SE130132.023	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH4 1.0-1.45	SE130132.024	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH4 3.0-3.45	SE130132.025	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH4 6.0-6.45	SE130132.026	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH5 1.0-1.45	SE130132.028	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH5 3.0-3.45	SE130132.029	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH5 6.0-6.45	SE130132.030	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH6 1.0-1.45	SE130132.031	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH6 3.0-3.45	SE130132.032	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH6 6.0-6.45	SE130132.033	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH7 1.0-1.45	SE130132.035	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH7 3.0-3.45	SE130132.036	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH7 6.0-6.45	SE130132.037	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH7 9.0-9.45	SE130132.038	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH8 0.5-1.0	SE130132.039	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH6_12.0-12.45	SE130132.041	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH8 3.0-3.45	SE130132.042	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH8 6.0-6.45	SE130132.043	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH8 9.0-9.45	SE130132.044	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014
BH8 12.0-12.45	SE130132.045	LB061715	30 Jul 2014	30 Jul 2014	13 Aug 2014	01 Aug 2014	06 Aug 2014	04 Aug 2014

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.5-0.95	SE130132.001	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 1.5-1.95	SE130132.004	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 3.0-3.45	SE130132.005	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 4.5-4.95	SE130132.006	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 7.5-7.95	SE130132.007	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 6.0-6.45	SE130132.008	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 9.0-9.45	SE130132.009	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 10.5-10.95	SE130132.010	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH1 15.0-15.45	SE130132.011	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH5 1.0-1.45	SE130132.028	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH5 3.0-3.45	SE130132.029	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH5 6.0-6.45	SE130132.030	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014
BH6_12.0-12.45	SE130132.041	LB061947	30 Jul 2014	30 Jul 2014	06 Aug 2014	06 Aug 2014	07 Aug 2014	06 Aug 2014

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.5-0.95	SE130132.001	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH1 1.5-1.95	SE130132.004	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH1 3.0-3.45	SE130132.005	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH1 4.5-4.95	SE130132.006	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014

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.

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography (continued) **Method: ME-(AU)-[ENV]AN245**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 7.5-7.95	SE130132.007	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH1 6.0-6.45	SE130132.008	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH1 9.0-9.45	SE130132.009	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH1 10.5-10.95	SE130132.010	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH1 15.0-15.45	SE130132.011	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH5 1.0-1.45	SE130132.028	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH5 3.0-3.45	SE130132.029	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH5 6.0-6.45	SE130132.030	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014
BH6_12.0-12.45	SE130132.041	LB061747	30 Jul 2014	30 Jul 2014	06 Aug 2014	01 Aug 2014	29 Aug 2014	06 Aug 2014

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.

No surrogates were required for this job.

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.

Conductivity and TDS by Calculation - Soil — Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography — Method: ME-(AU)-[ENV]AN245

Sample Number	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.

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE130132.007	LB061944.013	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	130	43.680686767	31	9
SE130132.017	LB061944.024	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	59	61.4190393013	33	4
SE130132.028	LB061945.013	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	57	54.1311465892	34	5
SE130132.039	LB061945.024	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	80	84.2092653061	32	6
SE130206.002	LB061946.013	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	2200	2356.8408	30	6
SE130261.003	LB061946.019	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	330	305.246065808	31	8

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE130132.012	LB061715.011	% Moisture	%w/w	0.5	17	20	35	14
SE130132.022	LB061715.022	% Moisture	%	0.5	16	15	36	3
SE130132.033	LB061715.033	% Moisture	%	0.5	15	14	37	4
SE130132.045	LB061715.044	% Moisture	%	0.5	17	16	36	5
SE130139.001	LB061715.046	% Moisture	%	0.5	17	17	36	1

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE130132.028	LB061947.012	pH (1:2)	pH Units	-	4.2	4.2	32	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.

Conductivity and TDS by Calculation - Soil — Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB061944.002	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	NA	303	85 - 115	100
LB061945.002	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	NA	303	85 - 115	104
LB061946.002	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	NA	303	85 - 115	103

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography — Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB061747.002	Chloride	mg/kg	0.25	NA	40	70 - 130	93
	Sulphate	mg/kg	0.5	NA	40	70 - 130	95

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.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE130132 R0

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

*	Non-accredited analysis.
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.

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

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Indra Jworchan	Manager	Jon Dicker
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Project	**SE130132 13234-1-Proposed Residential**	SGS Reference	**CE111063 R0**
Order Number	(Not specified)	Report Number	0000019196
Samples	4	Date Reported	05 Aug 2014
Date Started	04 Aug 2014	Date Received	01 Aug 2014

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(3146)

SIGNATORIES

Anthony Nilsson
Operations Manager

Jon Dicker
Manager Northern QLD

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE111063.001 Soil 30 Jul 2014 BH1 0.5-1.0	CE111063.002 Soil 30 Jul 2014 BH1 1.5-2.0	CE111063.003 Soil 30 Jul 2014 BH5 0.5-1.0	CE111063.004 Soil 30 Jul 2014 BH8 1.5-2.0
Moisture Content Method: AN002							
% Moisture	%	0.5		**8.8**	**13**	**15**	**27**
TAA (Titratable Actual Acidity) Method: AN219							
pH KCl	pH Units	-		**6.2**	**6.2**	**6.0**	**4.4**
Titratable Actual Acidity	kg H2SO4/T	0.25		<0.25	<0.25	<0.25	**3.0**
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5		<5	<5	<5	**61**
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01		<0.01	<0.01	<0.01	**0.10**
Sulphur (SKCl)	%w/w	0.005		<0.005	<0.005	<0.005	**0.008**
Calcium (CaKCl)	%w/w	0.005		**0.15**	**0.048**	**0.12**	**0.016**
Magnesium (MgKCl)	%w/w	0.005		**0.033**	<0.005	<0.005	**0.056**
TPA (Titratable Peroxide Acidity) Method: AN218							
Peroxide pH (pH Ox)	pH Units	-		**4.6**	**5.3**	**5.0**	**4.5**
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25		<0.25	<0.25	<0.25	**2.9**
TPA as moles H+/tonne	moles H+/T	5		<5	<5	<5	**60**
TPA as S % W/W	%w/w S	0.01		<0.01	<0.01	<0.01	**0.10**
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5		<5	<5	<5	<5
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25		<0.25	<0.25	<0.25	<0.25
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01		<0.01	<0.01	<0.01	<0.01
ANCE as % $CaCO_3$	% CaCO3	0.01		<0.01	<0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5		<5	<5	<5	<5
ANCE as S % W/W	%w/w S	0.01		<0.01	<0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)	%w/w	0.005		**0.022**	**0.009**	**0.009**	**0.028**
Peroxide Oxidisable Sulphur as moles H+/tonne	moles H+/T	5		**14**	**5**	**6**	**18**
Sulphur (Sp)	%w/w	0.005		**0.023**	**0.009**	**0.009**	**0.036**
Calcium (Cap)	%w/w	0.005		**0.17**	**0.053**	**0.13**	**0.017**
Reacted Calcium (CaA)	%w/w	0.005		**0.021**	<0.005	**0.006**	<0.005
Reacted Calcium (CaA)	moles H+/T	5		**10**	<5	<5	<5
Magnesium (Mgp)	%w/w	0.005		**0.040**	<0.005	<0.005	**0.060**
Reacted Magnesium (MgA)	%w/w	0.005		**0.006**	<0.005	<0.005	<0.005
Reacted Magnesium (MgA)	moles H+/T	5		**5**	<5	<5	<5
Net Acid Soluble Sulphur as % w/w	%w/w	0.005		-	-	-	**0.005**
Net Acid Soluble Sulphur as moles H+/tonne	moles H+/T	5		-	-	-	<5

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE111063.001 Soil 30 Jul 2014 BH1 0.5-1.0	CE111063.002 Soil 30 Jul 2014 BH1 1.5-2.0	CE111063.003 Soil 30 Jul 2014 BH5 0.5-1.0	CE111063.004 Soil 30 Jul 2014 BH8 1.5-2.0
SPOCAS Net Acidity Calculations Method: AN220							
s-Net Acidity	%w/w S	0.01		<0.01	<0.01	<0.01	**0.11**
a-Net Acidity	moles H+/T	5		**6**	<5	<5	**70**
Liming Rate	kg CaCO3/T	0.1		NA	<0.1	<0.1	**5.2**
Verification s-Net Acidity	%w/w S	-20		NA	NA	NA	NA
a-Net Acidity without ANCE	moles H+/T	5		**15**	**7**	**8**	**81**
Liming Rate without ANCE	kg CaCO3/T	0.1		NA	NA	NA	**6.1**
Chromium Reducible Sulphur (CRS) Method: AN217							
Chromium Reducible Sulphur (Scr)	%	0.005		<0.005	<0.005	<0.005	**0.022**
Chromium Reducible Sulphur (Scr)	moles H+/T	5		<5	<5	<5	**14**
HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014							
Acid Soluble Sulphur (SHCl)	%w/w	0.005		-	-	-	**0.013**

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.

Chromium Reducible Sulphur (CRS) **Method: ME-(AU)-[ENV]AN217**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chromium Reducible Sulphur (Scr)	LB019097	%	0.005	<0.005	0%	101%
Chromium Reducible Sulphur (Scr)	LB019097	moles H+/T	5	<5		

TAA (Titratable Actual Acidity) **Method: ME-(AU)-[ENV]AN219**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH KCl	LB019094	pH Units	-	6.6	0%	101%
Titratable Actual Acidity	LB019094	kg H2SO4/T	0.25	<0.25	0%	NA
Titratable Actual Acidity (TAA) moles H+/tonne	LB019094	moles H+/T	5	<5	0%	87%
Titratable Actual Acidity (TAA) S%w/w	LB019094	%w/w S	0.01	<0.01	0%	87%
Sulphur (SKCl)	LB019094	%w/w	0.005	<0.005	0 - 2%	
Calcium (CaKCl)	LB019094	%w/w	0.005	<0.005	0%	109%
Magnesium (MgKCl)	LB019094	%w/w	0.005	<0.005	1 - 2%	94%

TPA (Titratable Peroxide Acidity) **Method: ME-(AU)-[ENV]AN218**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Peroxide pH (pH Ox)	LB019095	pH Units	-	6.4	0 - 4%	100%
TPA as kg H_2SO_4/tonne	LB019095	kg H2SO4/T	0.25	<0.25	0 - 1%	93%
TPA as moles H+/tonne	LB019095	moles H+/T	5	<5	0 - 1%	93%
TPA as S % W/W	LB019095	%w/w S	0.01	<0.01	0 - 1%	93%
ANCE as % $CaCO_3$	LB019095	% CaCO3	0.01	<0.01	0%	
ANCE as moles H+/tonne	LB019095	moles H+/T	5	<5	0%	
ANCE as S % W/W	LB019095	%w/w S	0.01	<0.01	0%	
Sulphur (Sp)	LB019095	%w/w	0.005	<0.005	1 - 4%	100%
Calcium (Cap)	LB019095	%w/w	0.005	<0.005	0 - 1%	116%
Magnesium (Mgp)	LB019095	%w/w	0.005	<0.005	1 - 2%	99%

METHOD SUMMARY

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.
AN004	Soils, sediments and sludges are pulverised using an LM2 ringmill. The dry sample is pulverised to a particle size of >90% passing through a -75µm sieve.
AN014	This method is for the determination of soluble sulphate (SO4-S) by extraction with hydrochloric acid. Sulphides should not react and would normally be expelled. Sulphur is determined by ICP.
AN217	Dried pulped sample is mixed with acid and chromium metal in a rapid distillation unit to produce hydrogen sulphide (H2S) which is collected and titrated with iodine (I2(aq)) to measure SCR.
AN218	Soil samples are subjected to extreme oxidising conditions using hydrogen peroxide. Continuous application of heat and peroxide ensure all sulphide is converted to sulphuric acid. Excess peroxide is broken down by a copper catalyst prior to titration for acidity. Calcium, magnesium, and sulphur are determined by ICP-OES. Also included is a carbonate modification step which, depending on pH after the initial oxidation, gives a measure of ANC.
AN219	Dried pulped sample is extracted for 4 hours in a 1 M KCl solution. The ratio of sample to solution is 1:40. The extract is titrated for acidity. Calcium, magnesium, and sulphur are determined by ICP-AES.
AN220	SPOCAS Suite: Scheme for the calculation of net acidities and liming rates using a Fineness Factor of 1.5.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	This analysis is not covered by the scope of accreditation.	QFH	QC result is above the upper tolerance
**	Indicative data, theoretical holding time exceeded.	QFL	QC result is below the lower tolerance
^	Performed by outside laboratory.	-	The sample was not analysed for this analyte
		NVL	Not Validated

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

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

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.pv.sgsv3/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

COC received 30/7/14 @ 1.45pm

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place PENRITH NSW 2750
P O Box 880 PENRITH NSW 2751
Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW

PH: 8594 0400 **FAX:** 8594 0499

ATTN: Ms Angela Mamalicos

Sampling Date: 30/07/2014
Sampled By: MT
Project Manager: IJ

Job No: 13234/1
Project: Proposed Residential Subdivision
Location: 53C Warriewood Rd, Warriewood

Results required by:

	Sampling details: Location	Depth (m)	Sample type: Soil	Water	EC	Aggressivity	SPOCAS	Cr Reducible Sulphate		Notes	KEEP SAMPLE
1	BH1	0.5-0.95	DSP		✓	✓					YES
2		0.5-1.0	DSG				✓	✓		sPOCAS test includes pH(kcl), pH(ox), TPA,TAA,TSA	
3		1.5-2.0	DSG				✓	✓			
4		1.5-1.95	DSP		✓	✓					YES
5		3.0-3.45	DSP		✓	✓				CRS=Chromium Reducible Sulphur	YES
6		4.5-4.95	DSP		✓	✓					YES
7		7.5-7.95	DSP		✓	✓				Aggressivity testv includes pH, Chloride, Sulphate and Resistivity	YES
8		6.0-6.45	DSP		✓	✓					YES
9		9.0-9.45	DSP		✓	✓					YES
10		10.5-10.95	DSP		✓	✓					YES
11		15.0-15.45	DSP		✓	✓					YES
12	BH2	1.0-1.45	DSP		✓						YES
13		3.0-3.45	DSP		✓						YES
14		6.0-6.45	DSP		✓						YES
15		9.0-9.45	DSP		✓						YES
16		12.0-12.45	DSP		✓						YES
17		15.0-15.45	DSP		✓						YES

RECEIVED
30 JUL 2014
SE130132

Relinquished by: Name	Signature	Date	Received by: Name	Signature	Date
IJ	IJ	30/07/2014	Erin Adams		30/7/14 1.45pm

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
USG Undisturbed soil san
DSG Disturbed soil sample
DSP Disturbed soil sample (small plastic bag)
✓ Test required
* Purge & Trap
@ mole H^+/tonne
# Geotechnique Screen

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO:	**SGS ENVIRONMENTAL SERVICES** **UNIT 16** **33 MADDOX STREET** **ALEXANDRIA NSW**	**Sampling Date:**	30/07/2014
		Sampled By:	MT
		Project Manager:	IJ
PH:	**8594 0400** **FAX:** **8594 0499**		
ATTN:	Ms Angela Mamalicos		

Sampling details			**Sample type**		**Results required by:**									
Location		**Depth (m)**	**Soil**	**Water**	**EC**	**Aggressivity**	**SPOCAS**	**Cr Reducible Sulphate**						**KEEP SAMPLE**
18	BH3	1.0-1.45	DSP		✓									YES
19		3.0-3.45	DSP		✓									YES
20		6.0-6.45	DSP		✓									YES
21		9.0-9.45	DSP		✓									YES
22		12.0-12.45	DSP		✓									YES
23		15.0-15.45	DSP		✓									YES
24	BH4	1.0-1.45	DSP		✓									YES
25		3.0-3.45	DSP		✓									YES
26		6.0-6.45	DSP		✓									YES
27	BH5	0.5-1.0	DSG				✓	✓						
28		1.0-1.45	DSP		✓	✓								YES
29		3.0-3.45	DSP		✓	✓								YES
30		6.0-6.45	DSP		✓	✓								YES
31	BH6	1.0-1.45	DSP		✓									YES
32		3.0-3.45	DSP		✓									YES
33		6.0-6.45	DSP		✓									YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
IJ	IJ	30/07/2014	Erin Adams		30/7/14 4:45pm

Legend:

WG	Water sample, glass bottle	USG	Undisturbed soil sample (	DSP	Disturbed soil sample (small plastic bag)	* Purge & Trap	@ mole H^+/tonne
WP	Water sample, plastic bottle	DSG	Disturbed soil sample (gla	✓	Test required	# Geotechnique Screen	

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO:	**SGS ENVIRONMENTAL SERVICES** **UNIT 16** **33 MADDOX STREET** **ALEXANDRIA NSW**	**Sampling Date:**	30/07/2014	**Job No:**	13234/1
		Sampled By:	MT	**Project:**	Proposed Residential Subdivision
PH:	**8594 0400** **FAX:** **8594 0499**	**Project Manager:**	IJ	**Location:**	53C Warriewood Rd, Warriewood
ATTN:	Ms Angela Mamalicos				

Sampling details		Sample type		Results required by:									
Location	Depth (m)	Soil	Water	EC	Aggressivity	SPOCAS	Cr Reducible Sulphate						KEEP SAMPLE
34 BH7	0.5-1.0	DSG											
35	1.0-1.45	DSP		✓									YES
36	3.0-3.45	DSP		✓									YES
37	6.0-6.45	DSP		✓									YES
38	9.0-9.45	DSP		✓									YES
39 BH8	0.5-1.0	DSG		✓									YES
40	1.5-2.0	DSG				✓	✓						YES
●	1.0-1.45	DSP				✓	✓						YES
42	3.0-3.45	DSP		✓									YES
43	6.0-6.45	DSP		✓									YES
44	9.0-9.45	DSP		✓									YES
45	12.0-12.45	DSP		✓									YES
41 B+G	12.0-12.45												

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
IJ	IJ	30/07/2014	Erin Ades		30/7/14

Legend:

WG	Water sample, glass bottle	USG	Undisturbed soil sample	DSP	Disturbed soil sample (small plastic bag)	* Purge & Trap	@ mole H^+/tonne
WP	Water sample, plastic bottle	DSG	Disturbed soil sample (g	✓	Test required	# Geotechnique Screen	

SAMPLE RECEIPT ADVICE

SE130132

CLIENT DETAILS

Contact	Indra Jworchan
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	indra.jworchan@geotech.com.au
Project	**13234-1- 53C Warriewood Rd, Warriewood**
Order Number	(Not specified)
Samples	45

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 30/7/2014
Report Due	Wed 6/8/2014
SGS Reference	**SE130132**

SUBMISSION DETAILS

This is to confirm that 45 samples were received on Wednesday 30/7/2014. Results are expected to be ready by Wednesday 6/8/2014. Please quote SGS reference SE130132 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	45 Soils	Type of documentation received	COC
Date documentation received	30/07/2014@11:53am	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	4.0°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

Sample "BH8_1.0-1.45" was not received at SGS.
Sample "BH7 0.5-1.0" has not been marked for analysis on COC. Sample has been placed on hold and will not be analysed, unless otherwise instructed by client.
Samples "BH8_3.0-3.45", "BH8_6.0-6.45", "BH8_9.0-9.45" and "BH8_12.0-12.45" were received on 31/07/2014.
Extra sample received, labelled as "BH6_12-12.45" has been placed for EC and aggressivity analyses, as per client's email request received on 30/07/2014@03:59pm.

CRS / SPOCAS - Subcontracted to SGS Cairns, 2/58 Comport St, Portsmith QLD 4870, NATA Accreditation Number: 2562, Site Number: 3146.

SAMPLE RECEIPT ADVICE

SE130132

CLIENT DETAILS

Client Geotechnique

Project 13234-1- 53C Warriewood Rd, Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Chromium Reducible Sulphur (CRS)	Conductivity (1:2) in soil	Conductivity and TDS by Calculation - Soil	HCl Extractable S, Ca and Mg in Soil ICP OES	pH in soil (1:2)	Soluble Anions in Soil from 1:2 DI Extract by Ion	SPOCAS Net Acidity Calculations	TAA (Titratable Actual Acidity)	TPA (Titratable Peroxide Acidity)
001	BH1 0.5-0.95	-	2	1	-	1	2	-	-	-
002	BH1 0.5-1.0	3	-	-	3	-	-	6	7	21
003	BH1 1.5-2.0	3	-	-	3	-	-	6	7	21
004	BH1 1.5-1.95	-	2	1	-	1	2	-	-	-
005	BH1 3.0-3.45	-	2	1	-	1	2	-	-	-
006	BH1 4.5-4.95	-	2	1	-	1	2	-	-	-
007	BH1 7.5-7.95	-	2	1	-	1	2	-	-	-
008	BH1 6.0-6.45	-	2	1	-	1	2	-	-	-
009	BH1 9.0-9.45	-	2	1	-	1	2	-	-	-
010	BH1 10.5-10.95	-	2	1	-	1	2	-	-	-
011	BH1 15.0-15.45	-	2	1	-	1	2	-	-	-
012	BH2 1.0-1.45	-	-	1	-	-	-	-	-	-
013	BH2 3.0-3.45	-	-	1	-	-	-	-	-	-
014	BH2 6.0-6.45	-	-	1	-	-	-	-	-	-
015	BH2 9.0-9.45	-	-	1	-	-	-	-	-	-
016	BH2 12.0-12.45	-	-	1	-	-	-	-	-	-
017	BH2 15.0-15.45	-	-	1	-	-	-	-	-	-
018	BH3 1.0-1.45	-	-	1	-	-	-	-	-	-
019	BH3 3.0-3.45	-	-	1	-	-	-	-	-	-
020	BH3 6.0-6.45	-	-	1	-	-	-	-	-	-
021	BH3 9.0-9.45	-	-	1	-	-	-	-	-	-
022	BH3 12.0-12.45	-	-	1	-	-	-	-	-	-
023	BH3 15.0-15.45	-	-	1	-	-	-	-	-	-
024	BH4 1.0-1.45	-	-	1	-	-	-	-	-	-

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' 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

SE130132

CLIENT DETAILS

Client Geotechnique

Project 13234-1- 53C Warriewood Rd, Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Chromium Reducible Sulphur (CRS)	Conductivity (1:2) in soil	Conductivity and TDS by Calculation - Soil	HCl Extractable S, Ca and Mg in Soil ICP OES	pH in soil (1:2)	Soluble Anions in Soil from 1:2 DI Extract by Ion	SPOCAS Net Acidity Calculations	TAA (Titratable Actual Acidity)	TPA (Titratable Peroxide Acidity)
025	BH4 3.0-3.45	-	-	1	-	-	-	-	-	-
026	BH4 6.0-6.45	-	-	1	-	-	-	-	-	-
027	BH5 0.5-1.0	3	-	-	3	-	-	6	7	21
028	BH5 1.0-1.45	-	2	1	-	1	2	-	-	-
029	BH5 3.0-3.45	-	2	1	-	1	2	-	-	-
030	BH5 6.0-6.45	-	2	1	-	1	2	-	-	-
031	BH6 1.0-1.45	-	-	1	-	-	-	-	-	-
032	BH6 3.0-3.45	-	-	1	-	-	-	-	-	-
033	BH6 6.0-6.45	-	-	1	-	-	-	-	-	-
035	BH7 1.0-1.45	-	-	1	-	-	-	-	-	-
036	BH7 3.0-3.45	-	-	1	-	-	-	-	-	-
037	BH7 6.0-6.45	-	-	1	-	-	-	-	-	-
038	BH7 9.0-9.45	-	-	1	-	-	-	-	-	-
039	BH8 0.5-1.0	-	-	1	-	-	-	-	-	-
040	BH8 1.5-2.0	3	-	-	3	-	-	6	7	21
041	BH6_12.0-12.45	-	2	1	-	1	2	-	-	-
042	BH8 3.0-3.45	-	-	1	-	-	-	-	-	-
043	BH8 6.0-6.45	-	-	1	-	-	-	-	-	-
044	BH8 9.0-9.45	-	-	1	-	-	-	-	-	-
045	BH8 12.0-12.45	-	-	1	-	-	-	-	-	-

CONTINUED OVERLEAF

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

SE130132

CLIENT DETAILS

Client Geotechnique

Project 13234-1- 53C Warriewood Rd, Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Acid Neutralising Capacity (ANC)	Chromium Suite Net Acidity Calculations	Moisture Content
001	BH1 0.5-0.95	-	-	1
002	BH1 0.5-1.0	6	6	-
003	BH1 1.5-2.0	6	6	-
004	BH1 1.5-1.95	-	-	1
005	BH1 3.0-3.45	-	-	1
006	BH1 4.5-4.95	-	-	1
007	BH1 7.5-7.95	-	-	1
008	BH1 6.0-6.45	-	-	1
009	BH1 9.0-9.45	-	-	1
010	BH1 10.5-10.95	-	-	1
011	BH1 15.0-15.45	-	-	1
012	BH2 1.0-1.45	-	-	1
013	BH2 3.0-3.45	-	-	1
014	BH2 6.0-6.45	-	-	1
015	BH2 9.0-9.45	-	-	1
016	BH2 12.0-12.45	-	-	1
017	BH2 15.0-15.45	-	-	1
018	BH3 1.0-1.45	-	-	1
019	BH3 3.0-3.45	-	-	1
020	BH3 6.0-6.45	-	-	1
021	BH3 9.0-9.45	-	-	1
022	BH3 12.0-12.45	-	-	1
023	BH3 15.0-15.45	-	-	1
024	BH4 1.0-1.45	-	-	1

CONTINUED OVERLEAF

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

SAMPLE RECEIPT ADVICE

SE130132

CLIENT DETAILS

Client Geotechnique

Project 13234-1- 53C Warriewood Rd, Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Acid Neutralising Capacity (ANC)	Chromium Suite Net Acidity Calculations	Moisture Content
025	BH4 3.0-3.45	-	-	1
026	BH4 6.0-6.45	-	-	1
027	BH5 0.5-1.0	6	6	-
028	BH5 1.0-1.45	-	-	1
029	BH5 3.0-3.45	-	-	1
030	BH5 6.0-6.45	-	-	1
031	BH6 1.0-1.45	-	-	1
032	BH6 3.0-3.45	-	-	1
033	BH6 6.0-6.45	-	-	1
035	BH7 1.0-1.45	-	-	1
036	BH7 3.0-3.45	-	-	1
037	BH7 6.0-6.45	-	-	1
038	BH7 9.0-9.45	-	-	1
039	BH8 0.5-1.0	-	-	1
040	BH8 1.5-2.0	6	6	-
041	BH6_12.0-12.45	-	-	1
042	BH8 3.0-3.45	-	-	1
043	BH8 6.0-6.45	-	-	1
044	BH8 9.0-9.45	-	-	1
045	BH8 12.0-12.45	-	-	1

The above table represents SGS Environmental Services' 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.

GEOTECHNIQUE®
PTY LTD

ABN 64 002 841 063

PHASE 2 CONTAMINATION ASSESSMENT

LOTS 2 & 3 IN DP1115877
53A & 53B WARRIEWOOD ROAD, WARRIEWOOD

REPORT NO 13757/2-AA 27 JUNE 2016

Lemko Place, Penrith NSW 2750 PO Box 880, Penrith NSW 2751
Telephone (02) 4722 2700 Facsimile (02) 4722 2777
e-mail: info@geotech.com.au www.geotech.com.au

GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

Job No: 13757/2
Our Ref: 13757/2-AA
27 June 2016

Merrin Developments Pty Ltd
C/- Intercapital Consultants
155 Regent Street
RIVERSTONE NSW 2765
Email: len@intercapital.ws

Attention: Mr L Mariani

Dear Sir

re: **Proposed Residential Development**
Lots 2 & 3 in DP1115877 - 53A & 53B Warriewood Road, Warriewood
Phase 2 Contamination Assessment

Further to the phase 1 preliminary contamination assessment (PCA) report (Report No 13234/2-AA dated 25 August 2014), prepared by Geotechnique Pty Ltd (Geotechnique) for the property registered as Lots 2 and 3 in DP1115877 and Part Lot 3 in DP942319, located at 53A, 53B and 53 Warriewood Road, Warriewood and as requested, we have completed a phase 2 contamination assessment (CA) for a parcel of land currently registered as Lots 2 and 3 in DP1115877, located at 53A and 53B Warriewood Road, Warriewood (hereafter referred as site).

Reference should be made to Executive Summary.

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECHNIQUE PTY LTD

ANWAR BARBHUYIA
Associate
BE (Civil), MEngSc (Enviro), MIEAust

GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

EXECUTIVE SUMMARY

Further to the phase 1 preliminary contamination assessment (PCA) report (Report No 13234/2-AA dated 25 August 2014), prepared by Geotechnique Pty Ltd (Geotechnique) for the property registered as Lots 2 and 3 in DP1115877 and Part Lot 3 in DP942319, located at 53A, 53B and 53 Warriewood Road, Warriewood and as requested, this executive summary presents a synopsis of a phase 2 contamination assessment (CA) for a parcel of land currently registered as Lots 2 and 3 in DP1115877, located at 53A and 53B Warriewood Road, Warriewood (hereafter referred as site), indicated on Figure 1 (page 1 of the report).

We understand proposed residential development at the above site includes construction of residential dwellings and townhouses/apartment buildings with three storeys above the ground and one level of basement car park. The basement excavations will be up to about 3.0m deep.

The objective of the Phase 2 CA was to supplement the Phase 1 PCA Report 13234/2-AA with appropriate soil sampling and testing, in order to ascertain whether the site is likely to present a risk of harm to human health and/or the environment.

In order to achieve the objective of this assessment, the scope of work included review of the phase 1 preliminary contamination assessment report, site reconnaissance, test pit excavation, soil sampling and testing, and preparation of this report.

As shown on Drawing No 13757/2-AA1, the site is trapezoidal in shape and covers an area of approximately 1.609 hectares (ha)

The findings of this Phase 2 CA are summarised as follows:

- The site comprised two individual rural residential properties facing Warriewood Road.
- The site is proposed for residential development involving construction of residential dwellings and townhouses/apartment buildings with three storeys above the ground and one level of basement car park.
- The entire site is underlain by imported and site originated fill overlying natural clayey silt, sandy silt and clayey soil. The test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of fibro-cement pieces in the fill profile at test pit TP25. Moreover, one fibro-cement piece at the ground surface of each of two judgmental sampling locations (FCP1 and FCP2) was also observed. Both fibro-cement pieces were sent to laboratory for asbestos analysis. No other fibro-cement pieces were found on the ground surface at FCP1 and FCP2.

- All the laboratory test results satisfied the criteria for stating that the analytes selected are either not present i.e. concentrations less than laboratory limits of reporting, or present in the sampled soil at concentrations that do not pose a risk of hazard to human health or the environment under a "residential with access to soil" form of development, with the exception of elevated cadmium and PAH concentrations and detection of friable asbestos and boned asbestos containing material (ACM) fragments, as indicated on Drawing No 13757/2-AA2. Elevated Benzo(a)Pyrene TEQ concentrations and friable asbestos presents a risk of harm to human health, whilst elevated Benzo(a)Pyrene (BaP) and cadmium concentrations might impact on terrestrial ecosystems or on the growth of certain plants. ACM fragments present a potential risk of harm to human health.

The site is considered suitable for the proposed residential development subject to implementation of the following recommendations prior to site preparation and earthworks:

- Detailed sampling and testing in the vicinity of locations of concern, as indicated on Drawing No 13757/2-AA2, to delineate the extent of contamination.
- Sampling and testing of soils in the footprints of site features such as the houses, building, sheds, carport, glasshouse, concrete, recycled asphalt, gravel and bitumen covered areas, after complete demolition and removal or clearing.
- Development of a remedial action plan (RAP) to remediate PAH and asbestos contaminated fill materials with elevated Metals concentrations plus any other contamination identified through the recommended additional sampling and testing, followed by appropriate validation. We consider that the site can be made suitable for the proposed development following appropriate remediation and validation.

For any materials to be excavated and removed from the site, it is recommended that waste classification of the materials, in accordance with the "Waste Classification Guidelines Part 1: Classifying Waste" NSW EPA 2014 and NSW EPA guidelines for the resource recovery exemptions under the Protection of the Environment Operations (Waste) Regulation 2005, is undertaken prior to disposal at an appropriately licensed landfill or potential re-use at other sites.

If suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheets/pieces/pipes, ash material, etc) are encountered during any stage of future earthworks/site preparation/demolition/remediation, we recommend that this office is contacted for assessment. In the event of contamination, detailed assessment, remediation and validation will be necessary.

Any imported fill should be tested, or validation certificates provided by a qualified consultant, to ensure suitability for the proposed residential use. In addition, the imported fill must be free from asbestos, ash and odour, not be discoloured and not acid sulphate soil. The imported soil should either be virgin excavated natural materials (VENM) or excavated natural material (ENM).

Reference should be made to Section 15.0 of the report and Appendix C, which set out details of the limitations of the assessment.

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APPENDICES

1.0 INTRODUCTION

Further to the phase 1 preliminary contamination assessment (PCA) report (Report No 13234/2-AA dated 25 August 2014), prepared by Geotechnique Pty Ltd (Geotechnique) for the property registered as Lots 2 and 3 in DP1115877 and Part Lot 3 in DP942319, located at 53A, 53B and 53 Warriewood Road, Warriewood and as requested, we have completed a phase 2 contamination assessment (CA) for a parcel of land currently registered as Lots 2 and 3 in DP1115877, located at 53A and 53B Warriewood Road, Warriewood (hereafter referred as site), as indicated on Figure 1 below.

FIGURE 1

Map Data ©2016 Google

We understand proposed residential development at the above site includes construction of residential dwellings and townhouses/apartment buildings with three storeys above the ground and one level of basement car park. The basement excavations will be up to about 3.0m deep.

The objective of the Phase 2 CA was to supplement the Phase 1 PCA Report 13234/2-AA with appropriate soil sampling and testing, in order to ascertain whether the site is likely to present a risk of harm to human health and/or the environment.

This report was prepared generally in accordance with the NSW Environment Protection Authority (EPA), "Guidelines for Consultants Reporting on Contaminated Sites" – 2011, and to satisfy control B3.6 Contaminated Land and Potentially Contaminated Land of Pittwater Council 21 Development Control Plan 2014 as well as State Environmental Planning Policy No. 55 – Contaminated Land (SEPP55).

2.0 SCOPE OF WORK

In order to achieve the objectives of the assessment, the following scope of work was conducted:

- Review and summary of the *Phase 1 Preliminary Contamination Assessment* report prepared by Geotechnique in August 2014.
- An inspection by a Field Engineer from Geotechnique, to identify current site activities, site features and any visible or olfactory indicators of potential contamination.
- Soil sampling by the Field Engineer in accordance with a pre-determined sampling plan, developed with reference to the NSW EPA *Sampling Design Guidelines* and aimed at ascertaining the presence of soil contaminants in the open area of the site.
- Chemical analysis by NATA accredited testing laboratories, in accordance with chains of custody prepared by Geotechnique.
- Implementation of industry standard quality assurance (QA) and quality control (QC) measures. QC samples were also forwarded to the testing laboratories.
- Assessment of the laboratory analytical results against current applicable guidelines.
- Assessment of field and laboratory QA and QC.
- Preparation of this report.

3.0 SITE INFORMATION

The site is located on the south western side of Warriewood Road, Warriewood, in the local government area of Pittwater, as indicated on Figure 1 (page 1). The site comprises the entirety of Lots 2 and 3 in DP1115877. Reference may be made to Drawing No 13234/2-AA1 for the lot layout.

As shown on Drawing No 13757/2-AA1, the site is trapezoidal in shape and covers an area of approximately 1.609 hectares (ha)

At the time of inspection and field sampling on 30 May 2016 by a Field Engineer from Geotechnique, the site comprised two individual rural residential properties, facing Warriewood Road. During the inspection for the phase 2 CA, the site remained unchanged as observed during phase PCA in July 2014, as shown on Drawing No 13234/2-AA1.

Lot 2 in DP 1115877 (53A Warriewood Road) was a residential land. Former market gardening activities were reflected on the land terraces. A number of features were identified on site including: a fibro house with possible fibro roof, a colorbond garage, a galvanised iron (GI) and fibro shed, a GI shed, remnant of a former shed, a glass house, a GI chook house and a concrete driveway. A batter acting as a driveway along the north western boundary was partly covered with recycled asphalt. The land slopes gently from Warriewood Road frontage toward the centre then become flat toward Narrabeen Creek. The centre portion was quite boggy.

Lot 3 in DP 1115877 (53B Warriewood Road) was a residential land. The lot consisted of a 2 storey brick house with tile roof, a fibro house with colorbond roof and awning, a colorbond garden shed, an in-ground swimming pool, a GI shed, a colorbond shed and bitumen driveway. This lot appeared to have been formed by filling at the north-eastern portion for levelling under the houses, the pools and the driveways structures; and filling at the south western portion using coarse material such as gravel and building rubbles to create a stable surface on the original boggy ground.

The remainder of the site was grass and/or tree covered. There were no obvious features associated with any underground storage tanks (bowser, breather pipe, inlet valve and piping) or odour that would indicate the potential for contamination. There were no visible or olfactory indicators of potential contamination.

There were no air emissions emanating from the site and neighbouring properties.

The site is bound to the north west by rural residential land, to the north east by Warriewood Road and to the south east by a rural residential land and to the south west by Narrabeen Creek.

4.0 TOPOGRAPHY, GEOLOGY & HYDROGEOLOGY

In general, ground surface of the site slopes moderately to gently toward the creek.

Based on the Geological Map of Sydney (Geological Series Sheet 9130, Scale 1:100,000, Edition 1, 1983), published by the Department of Minerals Resources, Geological Survey of New South Wales, the subsurface materials across the site is anticipated to be stream alluvium and/or estuarine sand, comprising silty to peaty quartz sand, silt and clay, ferruginous and humic at places, with shell layers.

Reference to the Soil Landscape Map of Sydney (Soil Landscape Series Sheet 9130, Scale 1:100,000, Edition 2, 2002), prepared by the Department of Land and Water Conservation of NSW indicates that the landscape at the site belongs to Warriewood Group, which is characterised by level to gently undulating swales, depressions and in filled lagoons on Quaternary sand, with local relief of less than 10m, ground slopes of less than 3%, depth to water table of less than 2.0m. Soils in this group comprise sandy humus, sand and peaty, with thickness exceeding 1.5m. This landscape has high watertable and is subjected to flooding.

Reference should be made to Table 1 in Appendix A for descriptions of the soils encountered during sampling for this assessment. Based on information from the test pits and boreholes locations, the sub-surface profile across the site is generalised as follows:

Fill	The following 4 types of fill were encountered; Type 1: 300mm to 1.8m thick, clay, medium plasticity, brown, inclusion of gravel, cobbles and silt was encountered at TP5, TP10, TP11, TP13, TP14, TP16, TP17, TP19, TP20, TP24 and TP25, underlain by natural sandy silt or natural silty sandy clay or type 2 fill. Type 2: 800mm thick silty sandy clay, low plasticity, dark grey, inclusion of branches, building material, bricks, fibro-cement pieces, was encountered at TP25, underlain by natural silty sandy clay. Type 3: 100mm to 500mm thick Sandy Silt, fine grained, brown, inclusion of gravel, inclusion of gravel, was encountered at TP13, TP14, TP10 and TP25 to TP27, underlain by type 1 fill or natural silty sandy clay.

	Type 4: 100mm to 500mm thick clayey silt, fine grained, brown, was encountered at BH1, TP5, BH7, BH8, TP11, TP16 and TP17, underlain by type 1 fill or natural clayey silt. Based on the contents of the fill materials, the natural soil profiles and regional geological information, it appears that type 1 fill materials could have been imported to the site, whilst types 2 to 4 might have originated from the site.
Natural Soil	Clayey silt, fine grained, dark brown or silty sandy clay, low plasticity, dark grey-brown or sandy silt, fine grained, dark brown/pale grey or clay, medium to high plasticity, brown-grey, was encountered below the fill material across the site except for BH7 and BH8 due to hand auger refusal. Natural clayey silt was also encountered on the surface layer of BH2 to BH4, BH6, TP9, TP12 and TP15. Natural silty sandy clay was also encountered on the surface layer of TP18 and TP21 to TP23

Fibro-cement pieces were found in fill profile at TP25. No fibro-cement pieces were observed in other sampling points, except the presence of one fibro-cement piece at the ground surface of each of two judgmental sampling locations (FCP1 and FCP2). Both pieces were collected and sent to laboratory for asbestos analysis.

Based on observation and site topography, surface run-off would generally follow the topography and eventuate in the Narrabeen Creek, which borders the site to the south west.

A search was carried out during the phase 1 PCA through the website of the Department of Natural Resources for any registered groundwater bore data within a radius of one kilometre (km) of the site. The search revealed eight bores within this radius. However, features were available for six bores. The bores were drilled between 2004 and 2008, with standing water level at depths ranging from 0.9m to 7.0m. The bores were authorised / intended for monitoring purposes, test bore, recreation and irrigation usage purposes.

During the recent field works to install monitoring well as a part groundwater contamination assessment, groundwater was encountered at about 2.5m below the existing ground surface at about centre portion of the site. Preparation of a separate report regarding the groundwater contamination is underway.

5.0 SITE HISTORY INFORMATION

Geotechnique carried out a review of site history information as part of the Phase 1 PCA. The review included historical aerial photographs, certificates of land titles (past and present), Planning Certificates issued by Council under Section 149 of the Environmental Planning and Assessment Act 1979, EPA records and WorkCover NSW information pertaining to storage of dangerous goods. For details, reference should be made to Report 13234/2-AA.

Historical aerial photographs revealed that the site was rural residential land with market garden activities since at least 1950s. Market garden activates were continued in the north western portion of the site until the 2000s, whilst in the south eastern portion it continued until the 1970s. From the 1980s, more sheds/buildings were built in the south eastern portion of the site.

NSW Department of Lands records indicate various current and past private owners of the site. A farmer owned the site between 1913 and 1943 and two market gardeners owned the site between 1949 and 1982.

The Section 149 (2) Planning Certificates revealed no matters arising under the Contaminated Land Management (CLM) Act 1997.

A search of the EPA records revealed no EPA notices issued for the site.

A search of records held by WorkCover NSW did not locate any records of keeping dangerous goods at the site, including underground tanks.

6.0 SUMMARY OF THE PHASE 1 PCA REPORT

A Phase 1 PCA was carried out for the site currently registered as Lots 2 and 3 in DP1115877 and Part Lot 3 in DP942319, located at 53A, 53B and 53 Warriewood Road, Warriewood, in the local government area of Pittwater. The results were presented in the Geotechnique report *Phase 1 Preliminary Contamination Assessment* (Ref 13234/2-AA dated 25 August 2014). It is understood that the site is proposed for residential development.

The objective of the assessment was to ascertain whether the site potentially presents a risk of harm to human health and/or the environment.

In order to achieve the objectives of the assessment, the scope of work included a study of site history, geological and hydrogeological information and a site inspection.

At the time of inspections on 25 July 2014 by a Field Engineer from Geotechnique, the site comprised three individual properties. All properties were facing Warriewood Road. Two properties were rural residential, whilst the other one was vacant land. The following observations were made during the inspection, as shown on Drawing No 13234/2-AA1.

- The site comprised of three lots, Lot 2 and 3 in DP 1115877 and Lot 3 in DP 942319;
    - Lot 2 in DP 1115877 was a residential land. Former market gardening activities were reflected on the land terraces. A number of features were identified on site including: a fibro house with possible fibro roof, a colorbond garage, a galvanised iron (GI) and fibro shed, a GI shed, remnant of a former shed, a glass house, a GI chook house and a concrete driveway. A batter acting as a driveway along the north western boundary was partly covered with recycled asphalt. The land slopes gently from Warriewood Road frontage toward the centre then become flat toward Narrabeen Creek. The centre portion was quite boggy.
    - Lot 3 in DP 1115877 was a residential land. The lot consisted of a 2 storey brick house with tile roof, a fibro house with colorbond roof and awning, a colorbond garden shed, an in-ground swimming pool, a GI shed, a colorbond shed and bitumen driveway.
    - Lot 3 in DP 942319 was vacant land which appeared to be an easement.

Lot 3 1115877 and Lot 3 in DP 942319 appeared to have been formed by filling at the north-eastern portion for levelling under the houses, the pools and the driveways structures; and filling at the south western portion using coarse material such as gravel and building rubbles to create a stable surface on the original boggy ground.

The remainder of the site was grass and/or tree covered. There were no obvious features associated with any underground storage tanks (bowser, breather pipe, inlet valve and piping) or odour that would indicate the potential for contamination. There were no visible or olfactory indicators of potential contamination.

There were no air emissions emanating from the site and neighbouring properties.

The site is bound to the north west by rural residential land, to the north east by Warriewood Road and to the south east by a rural residential land and to the south west by Narrabeen Creek.

Based on the information obtained in preparation of the report, it is considered that the subject site has potential for contamination due to past market garden activities in the site, the presence of site features and potential fill within the site.

Based on the phase 1 PCA, the site would be suitable for the proposed residential development, subject to implementation of a suitable sampling and testing plan as a detailed contamination assessment to target the potential for contamination listed in Section 7.0 of the report. If any contaminants are identified the site could be made suitable for the proposed development following appropriate remediation and validation.

7.0 DATA QUALITY OBJECTIVES

The data qualitative objectives (DQO) are qualitative and quantitative statements that specify the quality of the data required for the assessment. DQO must ensure that the data obtained is sufficient to characterise the contamination of a site and enable appropriate assessment of health and environmental risks for the current or proposed use. The DQO were developed for this assessment in accordance with the NSW Department of Environment and Conservation (DEC) (2006), Guidelines for the NSW Site Auditor Scheme (2nd edition), as well as in accordance with the Australian Standard "*Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds*" (AS4482.1-2005) and "*Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 2: Volatile substances*" (AS4482.2-1999). The DQO process adopted is outlined below.

State the Problem

The site is rural residential land which was used as market garden activities in the past. The site also contains fill materials, houses, sheds, carport, glasshouse, GI features, shipping containers and recycled asphalt, gravel and bitumen covered areas. As a result the potential exists for contamination to have occurred within the site in the past and presently.

The site is proposed for residential development.

The following key professional personnel were involved in the assessment.

Mr Anwar Barbhuyia	Associate
Mr Justin Hofmann	Field Engineer

Identify the Decisions
The decisions to be made in completing the assessment are as follows:

- Does the site or is the site, likely to present a risk of harm to human health or the environment*?*
- Is the site currently suitable for the proposed end use?
- Is there any potential for groundwater contamination?
- Are there any off-site migration issues to be considered?
- Is further investigation required to adequately address the abovementioned decisions?
- Is further investigation required to delineate the extent of contamination identified?
- Does the site require remediation to ensure suitability for the proposed end use?

Identify Inputs to the Decisions
The inputs into the decision process are as follows:

- Historical information (presented in Section 5.0).
- Site operations and observation details (presented in Section 3.0).
- Systematic soil sampling at a density required generally to meet the NSW EPA "*Sampling Design Guidelines*" using a backhoe or hand auger, where sampling location is not accessible by a backhoe.
- Judgemental soil sampling, targeting the areas where fibro-cement pieces were observed on the ground surface.
- Soil profile information obtained through the sampling phase.
- Chemical and/or physical test data on analysed samples.
- Assessment of test data / data sets against applicable soil investigation levels in the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM), NSW Site Auditor Scheme, 2006 (Section 12.0). For asbestos, the assessed soil must not contain bonded asbestos containing material (ACM) in excess of 0.01%w/w and surface soil within the site is free of visible ACM, and friable asbestos in the soil is <0.001% w/w.

Define the Study Boundaries
The study boundary for this assessment is defined by the boundaries of the subject site, as shown on Drawing No 13757/2-AA1 and summarised in Section 3.0 of this report.

Develop a Decision Rule
The information obtained through this assessment will be used to characterise the site in terms of contamination issues and risk to human health and the environment. The decision rule in characterising the site will be as follows:

- Laboratory test results will be assessed individually.
- The assessment criteria are the NSW EPA produced and/or endorsed criteria, as specified in Section 12.0 of this report. For asbestos, the assessed soil must not contain bonded ACM in excess of 0.01%w/w and surface soil within the site is free of visible ACM, and friable asbestos in the soil is <0.001% w/w.

- The site will be deemed to potentially contain contamination "hot spots" if any of the individual concentrations exceed the assessment criteria adopted or any presence of asbestos-cement pieces on the surface soil or presence of bonded ACM in excess of 0.01%w/w in the assessed soil and/or detection of friable asbestos in excess of 0.001%w/w in the assessed soil. Further investigation, remediation and/or management will be recommended.

Laboratory test results will only be accepted and considered useable for this assessment under the following conditions:

- All laboratories used are accredited by NATA for the analyses undertaken.
- All detection limits set by the laboratories fall below the assessment criteria adopted.
- Analyte concentrations in the rinsate water sample do not vary significantly from the laboratory detection limits.
- The recovery of spike concentrations in the trip spike sample is sufficient so as not to impact on the reported concentrations of the soil samples when the same recovery is applied (BTEX only).
- The differences between the reported concentrations of analytes in the field duplicate samples and the corresponding original samples are within accepted limits (refer to Section 9.5).
- The differences between the reported concentrations of analytes in the inter-laboratory duplicate (split) samples and the corresponding original samples are within accepted limits (refer to Section 9.6).
- The QA/QC protocols and results reported by the laboratories comply with the requirements of the NEPM 1999 "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*" and Australian and New Zealand Environment and Conservation Council (ANZECC)-1996 "*Guidelines for the Laboratory Analysis of Contaminated Soils*".

Specify Limits on Decision Errors
The limits on decision errors for this assessment are as follows:

- Systematic sample numbers comply with those recommended in the NSW EPA sampling design guidelines, which have risk probabilities already incorporated. Sample numbers are therefore considered adequate for site characterisation. Judgmental samples were recovered from two sampling locations where fibro-cement pieces were observed on the ground surface.
- Analyte selection in the open areas is based on site history, site activities and the presence of fill materials. The possibility of any other potential contaminants that would be detected through field observation (through odours, staining, and colouring, presence of fibro-cement piece) might need to be included.
- The assessment criteria adopted from the guidelines stated in Section 12.0 have risk probabilities already incorporated.
- The acceptable limits for field and inter-laboratory duplicate (split) comparisons are outlined in Sections 9.5 and 9.6 of this report.
- The acceptance limits for laboratory QA/QC parameters are based on the laboratory reported acceptance limits and those stated in the NEPM 1999 "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*" and ANZECC 1996 "*Guidelines for the Laboratory Analysis of Contaminated Soils*".

Optimise the Design for Obtaining Data

- The procedures adopted for location and collection of environmental samples were developed prior to implementation, in accordance with NSW EPA guidelines and current industry practice. The sampling program was designed to ensure integrity of data collection during the assessment, including decontamination techniques, sample labelling, storage and chain of custody protocols.
- The analytical program was developed in theory prior to undertaking the sampling (based on site history, site activities and presence fill materials and soil stockpiles) and refined on the basis of field observations (both surface and sub-surface) during the sampling phase. All potential contaminants have been covered within the site.
- Only laboratories accredited by NATA for the analyses undertaken were used for this assessment. The laboratory performance is assessed through review of statistics calculated for QA samples such as blanks, spikes, duplicates and surrogates.
- The field QA/QC protocols adopted are outlined in Section 9.0 of this report. The QA/QC program incorporates preparation of traceable documentation of procedures used in the sampling and analytical program and in data validation procedures.

Data Quality Indicators

The performance of the assessment in achieving the DQO will be assessed through the application of Data Quality Indicators (DQI), defined as follows:

Precision	A quantitative measure of the variability (or reproducibility) of data.
Accuracy	A quantitative measure of the closeness of reported data to the “true” value.
Representativeness	The confidence (expressed qualitatively) that data is representative of each media present on the site.
Completeness	A measure of the amount of useable data from a data collection activity.
Comparability	The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

Assessment of the data quality indicators is presented in Section 8.0 (sampling) and Section 11.0 (analysis) of this report.

8.0 SAMPLING & ANALYSIS PLAN AND SAMPLING METHODOLOGY

Sampling and analyses for the Phase 2 CA were carried out to obtain a reasonable assessment of the following:

1. Nature, location and likely distribution of soil contaminants beneath the site.
2. The risks that the contaminants (if present) pose to human health or the environment, both presently and under the conditions of the proposed development.

The risk of harm to human health and the environment was determined through comparison of test results with NSW EPA produced or endorsed criteria available at the time, as discussed in Section 12.0 of this report.

Soil sampling was carried out on 30 and 31 May 2016 by a Field Engineer from Geotechnique, responsible for visually assessing the site, locating the test pits as close as possible to nominated locations, recovery of soil samples, preparation of samples for delivery to NATA accredited laboratories and logging the sub-surface profile encountered at each test pit and borehole location.

Based on the "*Sampling Design Guidelines for Contaminated Sites*" 1995, EPA, for site area of 1.609ha, twenty seven (27) systematic sampling positions were adopted and aimed at maximising coverage of the site area. Two judgemental sampling points (FCP1 and FCP2) were positioned where one fibro-cement piece was observed on the ground surface at each location.

The test pit and sample locations are shown on Drawing No 13757/2-AA1.

The sampling procedures adopted were as follows:

- The sample location was excavated or drilled to the depth interval nominated by the Field Engineer. The representative soil sample was recovered directly from the bulk bucket of the backhoe using a stainless steel trowel, or from the hand auger using disposable gloves. For sample location, surface sample was recovered by using a stainless steel trowel. The stainless steel auger and trowel were decontaminated prior to use in order to prevent cross contamination (refer to Section 9.2 for details of the procedures for decontamination of the auger and trowel).
- To minimise the potential loss of volatiles, the laboratory soil sample was immediately transferred to a labelled, laboratory supplied, 250ml glass jar and sealed with an airtight, Teflon screw top lid. The fully filled jar was then placed in a chilled container.
- The recovered soil sample for asbestos analysis was transferred into a small plastic bag, which was placed inside a large plastic bag.
- Fibro-cement pieces for asbestos analysis were collected into a separate small plastic bag, which was placed inside a large plastic bag.

In order to ensure the analytical performance of the primary laboratory, duplicate and split samples were prepared for analyses. Samples were kept in a labelled laboratory supplied glass jar (acid-washed and solvent-rinsed) and sealed with an airtight screw top Teflon lid. The fully filled jar was placed in a chilled container.

A rinsate water sample was collected and placed in a glass bottle and a vial supplied by the laboratory at completion of the each day sampling. The fully filled bottle and vial were labelled and placed in a chilled container.

At completion of each day field sampling, the chilled containers and large plastic bags were transported to our Penrith office. The chilled containers were then transferred to a refrigerator where the temperature was maintained below 4˚C.

The chilled containers with the trip spike samples and large plastic bags, were forwarded to the primary laboratory SGS Environmental Services (SGS) and the secondary laboratory, Envirolab Services Pty Ltd (Envirolab), both NATA accredited. Chains of Custody (COC) were then forwarded to the laboratories.

On receipt of the samples and COC, the laboratories returned the Sample Receipt Confirmation, verifying the integrity of all samples received.

The soil profile encountered, as described in Section 6.0 of this report, did not reveal any visual (staining, dying) or olfactory indicators of potential contaminants, with the exception of the presence of fibro-cement pieces in the fill profile at TP25 and on the ground surface at FCP1 and FCP2. As a result, and based on the potential for contamination identified in the *Phase 1 Preliminary Contamination Assessment* report, the following laboratory analysis plan was implemented:

- Discrete selected imported fill samples were analysed for Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), Total Petroleum Hydrocarbons (TPH), BTEX (Benzene, Toluene, Ethyl Benzene and Xylenes) and Polycyclic Aromatic Hydrocarbons (PAH), Organochlorine Pesticides (OCP) and Polychlorinated Biphenyls (PCB).
- Discrete selected fill samples originating from the site, covering at least one sample for each type of fill materials, were analysed for Metals (arsenic, cadmium, copper, lead, mercury and zinc) and OCP. For screening purposes, the samples were also analysed for chromium and nickel.
- Surface natural soil samples and natural soil samples, immediately below the fill materials, were analysed for Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) and/or OCP for screening purposes. Selected natural soil samples were also analysed for TPH, BTEX, PAH and PCB for screening purposes.
- Two judgmental soil samples where fibro-cement pieces were observed on the ground surface and fill samples with inclusions of fibro-cement pieces were analysed for asbestos. Fibro-cement pieces were also analysed for asbestos. Moreover, few selected fill and natural soil samples were also analysed for asbestos for screening purposes.

The following table provides a list of the data quality indicators (refer to Section 7.0) for the soil sampling phase of the assessment and the methods adopted in ensuring that the data quality indicators were met.

DATA QUALITY INDICATOR	METHOD(S) OF ACHIEVEMENT
Completeness	Good sampling coverage of open area of the site; sample numbers comply with NSW EPA sampling design guidelines. Two judgemental sampling points were positioned where one fibro-cement piece was observed on the ground surface at each location. Representative coverage of potential contaminants in the open area based on site history, site activities, presence of fill materials and fibro-cement pieces. On site visual assessment of soils uncovered. Use of trained and qualified field staff (Section 9.1). Preparation of sample location plan. Preparation of soil profile logs. Preparation of chain of custody records.

DATA QUALITY INDICATOR	METHOD(S) OF ACHIEVEMENT
Comparability	Using appropriate techniques for sample recovery. Appropriate industry standard decontamination procedures adopted (Section 9.2). Experienced samplers used. Using appropriate sample storage and transportation methods.
Representativeness	Good sampling coverage of open area of the site; sample numbers comply with NSW EPA sampling design guidelines. Two judgemental sampling points were positioned where one fibro-cement piece was observed on the ground surface at each location. Representative coverage of potential contaminants in the open area based on site history, site activities, presence of fill materials and fibro-cement pieces.
Precision and Accuracy	Rinsate blank water, trip spike, field duplicate, and inter-laboratory duplicate / split samples recovered or prepared (Section 9.3 to 9.6).

9.0 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

9.1 Sampling Personnel

Geotechnique undertook all the sampling associated with this assessment. A Field Engineer from Geotechnique (Justin Hofmann) nominated sampling positions based on the project brief prepared by the Project Manager, supervised (full time) the excavation of each test pit, carried out drilling using a hand auger at a number of locations, logged the soil profile encountered, recovered soil samples at a frequency determined by the sampling plan (project brief), packaged the samples (refer to Section 8.0).

Mr Hofmann has a Bachelor of Science degree and has been employed by Geotechnique as a Field Engineer since November 2015. At commencement of employment Mr Hofmann underwent supervised training in Geotechnique procedures for sampling and logging.

9.2 Decontamination Procedures

As stated in Section 8.0 of this report, soil samples were transferred directly to the laboratory supplied glass jar using a stainless steel trowel from the bulk bucket of the backhoe or direct from the stainless steel trowel or from the stainless steel hand auger using disposable gloves. The stainless steel hand auger and trowel were decontaminated prior to use. As stated in Sections 9.5 and 9.6, a trowel was used to divide the soil sample into two portions to prepare duplicate/split samples. Decontamination of the hand auger and trowel involved the following:

- Removal of soils adhering to the hand auger and trowel by scrubbing with a brush;
- Washing the hand auger and trowel thoroughly in a solution of phosphate free detergent (Decon 90) using brushes and disposable towels;
- Rinsing the hand auger and trowel thoroughly with distilled water;
- Repeating the washing / rinsing steps and rinsing with water;
- Drying the hand auger and trowel with a clean cloth.

A sample of the final rinsate water sample was recovered at completion of the each day sampling.

9.3 Rinsate Samples

A rinsate water sample was recovered on completion of each of the two days of field works for soil sampling in order to identify possible cross contamination between the sampling locations. Therefore, two (2) rinsate water samples (Rinsates R1 and R2) were recovered.

The rinsate water samples were analysed for Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). The test results for the rinsate water sample are summarised in Table A. The laboratory test results certificates are included in Appendix B.

As shown in Table A, all concentrations of analytes in the rinsate sample were less than the laboratory limits of reporting, which indicates that adequate decontamination had been carried out in the field.

9.4 Trip Spike Sample

Trip spike samples are obtained from the laboratory on a regular basis, prior to conducting field sampling where volatile substances are suspected. The samples are held in the Penrith office of Geotechnique, at less than 4°C, for a period of not more than seven days. During the field work, the trip spike samples are kept in the chilled container with soil samples recovered from the site. The trip spike sample is then forwarded to the primary laboratory together with the soil samples recovered from the site.

The laboratory prepares the trip spike by adding a known amount of pure petrol standard to a clean sand sample. The sample is mixed thoroughly to ensure a relatively homogenous distribution of the spike throughout the sample. When the sample is submitted for analysis, the same procedure is adopted for testing as for the soil samples being analysed from the site.

The purpose of the trip spike is to detect any loss or potential loss of volatiles from the soil samples during field work, transportation, sample extraction or testing.

Trip spike sample (TS1) was forwarded to the primary analytical laboratory with the samples collected from the site and was tested for BTEX. The test results for the trip spike sample, reported as a percentage recovery of the applied and known spike concentrations, are shown in Table B. The laboratory test results certificates are included in Appendix B.

As indicated in Table B, the results show a good recovery of the spike concentrations (ranging from 88% to 99%). Furthermore, all BTEX results were less than laboratory detection limits and there were no visible or olfactory indications of hydrocarbon contamination.

Based on the above, it is considered that any loss of volatiles from the recovered samples that might have occurred would not affect the outcome / conclusions of this report.

9.5 Duplicate Samples

A field duplicate sample is prepared in the field through the following processes:

- A larger than normal quantity of soil is recovered from the sample location selected for duplication.
- The sample is placed in a decontaminated stainless mixing bowl and divided into two portions, using the decontaminated trowel.

- A portion of the sub-samples was immediately transferred, using the decontaminated trowel, into a labelled, laboratory supplied, 250ml glass jar and sealed with an airtight, Teflon screw top lid. The fully filled jar was labelled as the duplicate sample and immediately placed in a chilled container.
- The remaining portion is stored in the same way and labelled as the original sample.

Duplicate samples were prepared on the basis of sample numbers recovered during the field work overall. The duplicate sample frequency was computed using the total number of samples analysed as part of this assessment. The duplicate sample frequencies computed are as follows:

Metals	67 samples analysed	4 duplicates	5.9% frequency
TPH	16 samples analysed	1 duplicate	6.3% frequency
BTEX	16 samples analysed	1 duplicate	6.3% frequency
PAH	18 samples analysed	1 duplicate	5.6% frequency
OCP	40 samples analysed	2 duplicates	5.0% frequency
PCB	8 samples analysed	1 duplicate	13% frequency

The duplicate frequency adopted generally complies with the NEPM, which recommends a duplicate frequency of at least 5%.

The laboratory test results are summarised in Tables C1 to C4. The laboratory test results certificates are included in Appendix B.

A comparison was made of the laboratory test results for the duplicate sample with the original sample and the Relative Percentage Differences (RPD) were computed to assess the accuracy of the laboratory test procedures. RPD within 30% are generally considered acceptable. However, this variation can be higher for organic analysis than for inorganics and for low concentrations of analytes.

As shown in Tables C1 to C4 the comparisons between the duplicates and corresponding original samples indicated generally acceptable RPD, with the exception of the RPD of some Metals and PAH, which were in excess of 30% mainly due to heterogeneity of the samples. Therefore, the variations are not considered to be critical and the test results provided by SGS are of adequate accuracy and reliability for this assessment.

9.6 Inter-laboratory Duplicate / Split Samples

The inter-laboratory duplicate / split sample provides a check on the analytical performance of the primary laboratory. Inter-laboratory duplicate/split sample was prepared on the basis of sample numbers recovered during field work and the analyses undertaken by the primary laboratory.

The inter-laboratory duplicate/ split samples were prepared in the same manner as the duplicate sample. Reference should be made to Section 9.5.

The split sample frequency was computed using the total number of samples analysed as part of this assessment. The split sample frequencies computed are as follows:

Metals	67 samples analysed	4 splits	5.9% frequency
OCP	40 samples analysed	2 splits	5.0% frequency

The split sample frequency adopted generally complies with the NEPM, which recommends a frequency of 5%.

The laboratory test results are summarised in Tables D1 to D4. The laboratory test results certificates are included in Appendix B.

Based on Schedule B (3) of the NEPM the difference in the results between the split samples should generally be within 30% of the mean concentration determined by both laboratories, i.e., RPD should be within 30%. However, this variation can be higher for organic analysis than for inorganics and for low concentrations of analytes.

As shown in Tables D1 to D4, the comparisons between the splits and corresponding original samples indicated generally acceptable RPD, with the exception of the RPD of a number of Metals, which were in excess of 30% mainly due to heterogeneity of the samples. Therefore, the variations are not considered to be critical and the test results provided by the primary laboratory are deemed reliable for this assessment.

10.0 LABORATORY QUALITY ASSESSMENT AND QUALITY CONTROL

Geotechnique uses only laboratories accredited by the National Association of Testing Authorities (NATA) for chemical analyses. The laboratory must also incorporate quality laboratory management systems to ensure that trained analysts using validated methods and suitably calibrated equipment produce reliable results.

In addition to the quality control samples the laboratory must also ensure that all analysts receive certification as to their competence in carrying out the analysis and participate in national and international proficiency studies.

SGS and Envirolab are accredited by NATA and operate a Quality System designed to comply with ISO / IEC 17025.

Generally within the allowable holding times, detailed in Schedule B(3) of The *National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM)* by the National Environment Protection Council (NEPC), the recovered discrete soil samples were analysed. It should be noted that there is no specific holding time for asbestos analysis. Within the allowable holding times for water detailed in Standard Methods for the Examination of Water and Wastewater (APHA) the rinsate samples were analysed.

The test methods adopted by the laboratories are indicated with the laboratory test results certificates in Appendix B. As part of the analytical run for the project the laboratories included laboratory blanks, duplicate samples, laboratory control samples, matrix spikes and/or surrogate spikes.

We have checked the QA/QC procedures and results adopted by the laboratories against the appropriate guidelines. The quality control sample numbers adopted by SGS and Envirolab are considered adequate for the analyses undertaken.

The methods used by SGS and Envirolab have been validated as recommended in the NEPM and ANZECC guidelines and endorsed by NATA.

The samples analysed for TPH (C6–C9) and/or BTEX were extracted by the purge and trap method recommended by the NSW EPA.

All reported laboratory Limits of Reporting (LOR) / Practical Quantitation Limits (PQL) were less than the assessment criteria adopted for each analyte or analyte group.

Overall, the quality control elements adopted by SGS and Envirolab indicate that the analytical data falls within acceptable levels of accuracy and precision for the analysis of soils. The analytical data provided is therefore considered to be reliable and useable for this assessment.

11.0 QA/QC DATA EVALUATION

The following table provides a list of the data quality indicators for the analytical phase of the assessment and the methods adopted in ensuring that the data quality indicators were met.

DATA QUALITY INDICATOR	METHOD(S) OF ACHIEVEMENT
Data Completeness	Laboratory sample receipt information received confirming receipt of samples intact and appropriate chain of custody. Analysis for all potential contaminants of concern in the open area of the site. NATA registered laboratory analytical reports / certificates of analysis provided.
Data Comparability	Use of NATA registered laboratories. Test methods consistent for each sample. Test methods comparable between primary and secondary laboratory. Generally acceptable RPD between original samples and field duplicates and inter-laboratory duplicate / split samples. A number of high RPD recorded due to non-homogeneous soil matrix.
Data Representativeness	Representative coverage of potential contaminants in the open area based on site history, site activities, presence of fill materials and fibro-cement pieces. Adequate duplicate, split, trip spike and rinsate sample numbers. Adequate laboratory internal quality control and quality assurance methods, complying with the NEPM.
Data Precision and Accuracy	Acceptable concentrations in rinsate blank water samples. Acceptable recoveries of spike concentrations in trip spike sample. Acceptable RPD for duplicate samples comparison overall. Acceptable RPD for inter-laboratory duplicate / split samples comparison overall. Appropriate and validated laboratory test methods used. Adequate laboratory performance based on results of the blank samples, duplicates, surrogate spike samples, control samples and/or matrix spike samples.

Based on the above it is considered that both laboratories complied with the quality assurance and quality control data quality indicators. As such, it is concluded that the laboratory test data obtained are reliable and useable for this assessment.

12.0 ASSESSMENT CRITERIA

Investigation levels and screening levels developed in the NEPM 2013 were used in this assessment for soil samples, as follows:

- Risk-based Health Investigation Levels (HIL) for a broad range of metals and organic substances. The HIL are applicable for assessing human health risk via all relevant pathways of exposure. The HIL as listed in Table 1A (1) of Schedule B1 "*Guideline on Investigation Levels for Soil and Groundwater*" are provided for different land uses.

  The site is proposed for residential development involving construction of residential dwellings and townhouses/apartment buildings with three storeys above the ground and one level of basement car park. Therefore, with regard to human health, analytical results will be assessed against risk based more stringent HIL for *residential with garden/accessible soil* (HIL A).

- Health Screening Levels (HSL) for TRH fractions and Naphthalene are applicable for assessing human health risk via inhalation and direct contact pathways. The HSL depend on specific soil physicochemical properties, land use scenarios and the characteristics of building structures. The HSL listed in Table 1A(3) of Schedule B1 "*Guideline on Investigation Levels for Soil and Groundwater*" apply to different soil types and depths below surface to >4 m.

  For this assessment, the analytical results were assessed against the available HSL for *residential with garden/accessible soil* (HSL A) for silt to depth 0m to <1m and 1m to <2m, and clay to depth of 0m to <1m, 1m to <2m and 2m to <4m.

- Ecological Screening Levels (ESL) for selected petroleum hydrocarbon compounds, TPH fractions and Benzo(a)Pyrene are applicable for assessing the risk to terrestrial ecosystems. ESL listed in Table 1B(6) of Schedule B1 "*Guideline on Investigation Levels for Soil and Groundwater*" broadly apply to coarse and fine-grained soils and various land uses and are generally applicable to the top 2m of soil.

  The analytical result was assessed against the available ESL for *residential with garden/accessible soil* for fine-grained soil (clay and silt).

- Ecological Investigation Levels (EIL), a specific type of Soil Quality Guidelines (SQG) for selected metals, is applicable for assessing the risk to terrestrial ecosystems. EIL listed in Table 1B(1-5) of Schedule B1 "*Guideline on Investigation Levels for Soil and Groundwater*" depend on specific soil physicochemical properties and land use scenarios and generally apply to the top 2m of soil. For arsenic and lead, generic EIL are adopted, for *urban residential* land use for aged contamination. For other metals, where available, EIL are calculated using the EIL calculator developed by CSIRO for NEPC. Otherwise, where available, EIL are calculated using 30% effect concentration (EC30) or lowest observed effect concentrations (LOEC) toxicity data. EIL are the sum of the added contaminant limit (ACL) and the ambient background concentration (ABC).

  For this assessment the analytical results were assessed against the available SQG / EIL for *urban residential* land use for aged contamination in soil for low traffic volume.

- Due to a lack of EIL for cadmium and mercury, the available Provisional Phytotoxicity Based Investigation Levels (PIL) published in the *Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2006) and EIL published in the NEPM 2013 were used, with regard to protection of the environment and impact on plant growth.

For discrete soil samples the individual concentrations of analytes were assessed against the HIL A / HSL A / ESL / EIL. For discrete soil samples the individual concentrations of cadmium and mercury were assessed against the PIL and HIL A.

For asbestos, the assessed soil must not contain bonded ACM in excess of 0.01%w/w and surface soil within the site is free of visible ACM, and friable asbestos in the soil is <0.001% w/w.

The site (or study area) will be deemed contaminated or containing contamination "hot spots" if the above criteria are unfulfilled. Further investigation, remediation and/or management will be recommended if the area of concern is found to be contaminated or contain contamination "hot spots".

13.0 FIELD & LABORATORY TEST RESULTS, ASSESSMENT & DISCUSSION

13.1 Field Results

Details of the sub-surface conditions encountered during field work for this assessment are presented in Table 1 in Appendix A of this report. As discussed in Section 4.0, the general soil profile comprised imported and site originated fill overlying natural clayey silt, sandy silt and clayey soil.

The test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, except presence of fibro-cement pieces at TP25. Moreover, one fibro-cement piece was observed at the ground surface of each of two judgmental sampling locations (FCP1 and FCP2). Both pieces were collected and sent to laboratory for asbestos analysis.

13.2 Analytical Results

Reference may be made to Appendix B for the actual laboratory analytical reports from SGS. The test results are also presented in Tables E1 to E3 and F to I together with the assessment criteria adopted. A discussion of the test data is presented in the following sub-sections.

13.2.1 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni & Zn)

The Metals test results for discrete fill samples are presented in Table E1 and as shown, all concentrations of Metals were below the available relevant Ecological Investigation Level (EIL) and Health Investigation Levels (HIL) for residential development with garden/accessible soil (HIL A). Concentrations of cadmium (Cd) and mercury (Hg) were also below the relevant provisional phytotoxicity based investigation levels (PIL), with the exception of highlighted Cd concentrations. The Cd Concentration (3.5mg/kg and 4.7mg/kg) might impact on the growth of certain plants but would not present a risk of harm to human health.

The Metals test results for surface natural soil samples and natural soil samples, immediately below the fill materials, are presented in Tables E2 and E3, and as shown all concentrations of Metals were below the available relevant EIL and HIL A. Concentrations of Cd and Hg were also below the relevant PIL.

13.2.2 TPH and BTEX

The TPH and BTEX test results for the selected discrete imported fill and deeper natural soil samples, immediately below the fill materials are presented in Table F. As shown in Table F, the concentrations of F1 (TPH C6-C10 less BTEX), F2 (TPH >C10-C16 less Naphthalene), F3 (TPH >C16-C34), F4 (TPH >C34-C40) and BTEX were below the relevant Health Screening Levels A (HSL A) and / or Ecological Screening Levels (ESL) adopted. Moreover, most of the test results were below the laboratory limits of reporting (LOR).

13.2.3 Polycyclic Aromatic Hydrocarbons (PAH)

The PAH test results for selected discrete imported fill and deeper natural soil samples, immediately below the fill materials, are presented in Table G and as shown all Benzo(a)pyrene (BaP), BaP TEQ, Naphthalene and Total PAH were below the relevant HIL A or HSL A or EIL or ESL adopted, with the exception of highlighted Benzo(a)pyrene (BaP) and BaP TEQ concentrations.

The BaP TEQ concentration exceeded the relevant HIL A, whilst BaP concentration exceeded the relevant ESL.

The BaP TEQ concentration (6.3mg/kg) presents a risk of harm to human health, whilst BaP concentration (4.9mg/kg) might impact on terrestrial ecosystems.

13.2.4 Organochlorine Pesticides (OCP)

The OCP test results for the discrete soil samples are presented in Table H and as indicated, all concentrations of OCP were well below the relevant HIL A. Concentrations of DDT were also well below the EIL. Most of the test results were below the laboratory LOR.

13.2.5 Polychlorinated Biphenyls (PCB)

The PCB test results for the selected discrete imported fill and deeper natural soil samples, immediately below the fill materials, are presented in Table H and as indicated the concentrations of PCB were below the relevant HIL A adopted as well as below the laboratory LOR.

13.2.6 Asbestos

The asbestos test results for the recovered selected discrete fill and deeper natural soil samples, immediately below the fill materials, are presented in Table I, and as indicated, no bonded asbestos found at the limit of reporting of 0.01% w/w. As also indicated in Table I, no friable asbestos found at the limit of reporting of 0.001% w/w, with the exception of TP14 (0-0.15m), TP25 (1.5-1.8m) and FCP2 (0-0.15m) where friable Chrysotile asbestos were found.

As also shown in Table I, Fibro-cement pieces recovered from the ground surface at FCP2 and fill profile at TP25 (1.5-1.8m), contain bonded Amosite and/or Chrysotile asbestos. As the asbestos-cement piece was sent to the laboratory for asbestos analysis, no other asbestos-cement pieces were observed on the ground surface at FCP2. As also shown in Table I, asbestos was not detected in the fibro-cement pieces observed on the ground surface at FCP1 and in the fill profile at TP25 (0.5-1.5m).

14.0 CONCLUSION AND RECOMMENDATIONS

The findings of this Phase 2 CA are summarised as follows:

- The site comprised two individual rural residential properties facing Warriewood Road.
- The site is proposed for residential development involving construction of residential dwellings and townhouses/apartment buildings with three storeys above the ground and one level of basement car park.
- The entire site is underlain by imported and site originated fill overlying natural clayey silt, sandy silt and clayey soil. The test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of fibro-cement pieces in the fill profile at test pit TP25. Moreover, one fibro-cement piece at the ground surface of each of two judgmental sampling locations (FCP1 and FCP2) was also observed. Both fibro-cement pieces were sent to laboratory for asbestos analysis. No other fibro-cement pieces were found on the ground surface at FCP1 and FCP2.
- As presented in summary tables (Tables E1 to E2 and F to I) and discussed in Section 13.2, all the laboratory test results satisfied the criteria for stating that the analytes selected are either not present i.e. concentrations less than laboratory LOR, or present in the sampled soil at concentrations that do not pose a risk of hazard to human health or the environment under a “residential with access to soil” form of development, with the exception of elevated cadmium and PAH concentrations and detection of friable asbestos and boned asbestos containing material (ACM) fragments, as indicated on Drawing No 13757/2-AA2. Elevated Benzo(a)Pyrene TEQ concentrations and friable asbestos presents a risk of harm to human health, whilst elevated Benzo(a)Pyrene (BaP) and cadmium concentrations might impact on terrestrial ecosystems or on the growth of certain plants. ACM fragments present a potential risk of harm to human health.

The site is considered suitable for the proposed residential development subject to implementation of the following recommendations prior to site preparation and earthworks:

- Detailed sampling and testing in the vicinity of locations of concern, as indicated on Drawing No 13757/2-AA2, to delineate the extent of contamination.
- Sampling and testing of soils in the footprints of site features such as the houses, building, sheds, carport, glasshouse, concrete, recycled asphalt, gravel and bitumen covered areas, after complete demolition and removal or clearing.
- Development of a remedial action plan (RAP) to remediate PAH and asbestos contaminated fill materials with elevated Metals concentrations plus any other contamination identified through the recommended additional sampling and testing, followed by appropriate validation. We consider that the site can be made suitable for the proposed development following appropriate remediation and validation.

For any materials to be excavated and removed from the site, it is recommended that waste classification of the materials, in accordance with the "Waste Classification Guidelines Part 1: Classifying Waste" NSW EPA 2014 and NSW EPA guidelines for the resource recovery exemptions under the Protection of the Environment Operations (Waste) Regulation 2005, is undertaken prior to disposal at an appropriately licensed landfill or potential re-use at other sites.

If suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheets/pieces/pipes, ash material, etc) are encountered during any stage of future earthworks/site preparation/demolition/remediation, we recommend that this office is contacted for assessment. In the event of contamination, detailed assessment, remediation and validation will be necessary.

Any imported fill should be tested, or validation certificates provided by a qualified consultant, to ensure suitability for the proposed residential use. In addition, the imported fill must be free from asbestos, ash and odour, not be discoloured and not acid sulphate soil. The imported soil should either be virgin excavated natural materials (VENM) or excavated natural material (ENM).

15.0 LIMITATIONS

Within the scope of work outlined in the quote dated 24 May 2016 (Reference Q7607-2), the services performed by Geotechnique in preparing this report were conducted in a manner consistent with the level of quality and skill generally exercised by members of the profession and consulting practice.

This report has been prepared for Merrin Developments Pty Ltd through Intercapital Consultants for the purpose stated within. Northern Beaches Council may rely upon the report for development and/or construction application determinations. Any reliance on this report by other parties shall be at such parties' sole risk as the report might not contain sufficient information for other purposes.

This report shall only be presented in full and may not be used to support any objective other than those set out in the report, except where written approval is provided by Geotechnique Pty Ltd.

The information in this report is considered accurate at the completion of field sampling (31 May 2016), in accordance with the current conditions of the site. Any variations to the site form or use beyond this date might nullify the conclusions stated.

No contamination assessment can eliminate all risk; even a rigorous professional assessment might not detect all contamination within a site.

Presented in Appendix C is a document entitled "Environmental Notes", which should be read in conjunction with this report.

GEOTECHNIQUE PTY LTD

LIST OF REFERENCES

Australian Standard "Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds" (AS4482.1-2005)

Australian Standard "Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 2: Volatile substances" (AS4482.2-1999)

Composite Sampling, National Environmental Health Forum Monographs, Soil Services No 3, - William H Lock 1996

Contaminated Land Management Act 1997

Contaminated Land Management Regulation 1998

Contaminated Sites: Guidelines for Assessing Former Orchard and Market Garden - NSW Department of Environment and Conservation (DEC) 2005

Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites – NSW Environment Protection Authority 2011

Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition) –NSW DEC 2006

Contaminated Sites: Sampling Design Guidelines - NSW Environment Protection Authority 1995

Geology of Sydney 1:100,000 Sheet (9130) – Geological Survey of New South Wales, Department of Mineral Resources 1983

Guidelines for the Laboratory Analysis of Contaminated Soils - Australian and New Zealand Environment and Conservation Council (ANZECC) 1996

Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land – Department of Urban Affairs and Planning / NSW Environment Protection Authority 1998

National Environmental Protection (Assessment of Site Contamination) Amendment Measures 2013 - National Environmental Protection Council

National Environment Protection (Assessment of Site Contamination) Measure – National Environmental Protection Council 1999

Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A – The Excavated Natural Material Exemption & Order 2014

Soil Landscape of Sydney 1:100,000 Sheet (9130) – Department of Land & Water Conservation 2002

Standard Methods for the Examination of Water and Wastewater – American Public Health Association (APHA)

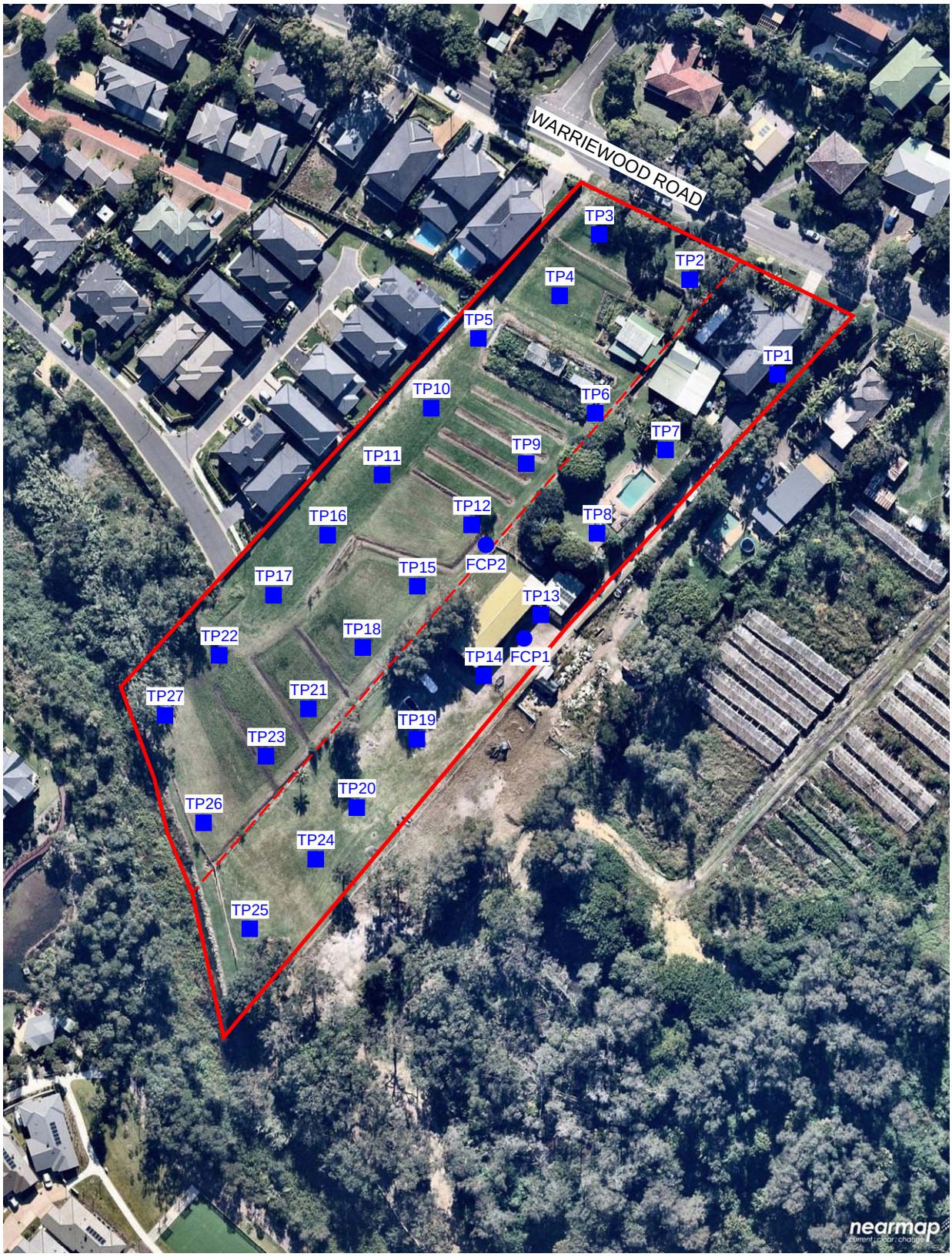
Waste Classification Guidelines Part 1: Classifying Waste - NSW EPA (November 2014)

DRAWINGS

DRAWING NO 13757/2-AA1
TEST PIT & SAMPLE LOCATIONS

DRAWING NO 13234/2-AA1
LOT LAYOUT & SITE FEATURES

DRAWING NO 13757/2-AA2
LOCATIONS OF CONCERN



Imagery ©2016 NearMap.com

N

LEGEND

- Test Pit
- Sample

0 15 30 45 60 75m

Scale 1:1500

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Intercapital Consultants
Proposed Residential Development
Lots 2 & 3 in DP1115877
53A & 53B Warriewood Road, Warriewood

Test Pit & Sample Locations

Drawing No: 13757/2-AA1
Job No: 13757/2
Drawn By: MH
Date: 23 June 2016
Checked By: JH/AB

File No: 13757-2
Layers: 0, AA1

Imagery ©2014 NearMap.com

0 15 30 45 60 75m

Scale 1:1500

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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Intercapital Consultants
Proposed Residential Development
Lots 2, 3 in DP1115877 and Lot 3 in DP942319
53A, 53B & 53 Warriewood Road, Warriewood

Lot Layout & Site Features

Drawing No: 13234/2-AA1
Job No: 13234/2
Drawn By: MH
Date: 25 August 2014
Checked By: AN/AB

File No: 13234-2
Layers: 0, AA1

LEGEND

- Test Pit
- Sample

Imagery ©2016 NearMap.com

0 15 30 45 60 75m

Scale 1:1500

Sample Location	Depth (m)	Contaminant	Concentration (mg/kg)	Level (mg/kg)			
				HIL A	EIL	PIL	ESL
TP14	0-0.5	Friable Chrysotile Asbestos	**NA**	-	-	-	-
TP20	0-0.5	Benzo(a)Pyrene (BaP), BaP TEQ	**4.9, 6.3**	- Bap TEQ = 3	- -	- -	BaP = 0.7 -
TP25	0.5-1.0	Cadmium (Cd)	**3.5**	Cd = 20	-	Cd= 3	-
TP25	1.0-1.5	Cd	**4.7**	Cd = 20	-	Cd= 3	-
TP25	1.5-1.8	Friable Chrysotile Asbestos & Bonded ACM fragments	**NA**	-	-	-	-
FCP2	0-0.1	Friable Chrysotile Asbestos	**NA**	-	-	-	-

Notes:

HIL A: Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

EIL : Ecological Investigation Level of aged Metals for urban residential land use

PIL : Provisional Phytotoxicity Based Investigation Level

ESL : Ecological Screening Level for urban residential land use

ACM : Asbestos Containing Material

NA : Not Applicable

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Lots 2 & 3 in DP1115877
53A & 53B Warriewood Road, Warriewood

Locations of Concern

Drawing No: 13757/2-AA2
Job No: 13757/2
Drawn By: MH
Date: 23 June 2016
Checked By: AB

File No: 13757-2
Layers: 0, AA2

TABLES

TABLE A
RINSATE SAMPLES
(Ref No: 13757/2-AA)

ANALYTES	Rinsate R1 30/05/2016	Rinsate R2 31/05/2016
METALS	**(mg/L)**	**(mg/L)**
Arsenic	<0.02	<0.02
Cadmium	<0.001	<0.001
Chromium	<0.005	<0.005
Copper	<0.005	<0.005
Lead	<0.02	<0.02
Mercury	<0.0001	<0.0001
Nickel	<0.005	<0.005
Zinc	<0.01	<0.01

TABLE B
TRIP SPIKE SAMPLE
(Ref No: 13757/2-AA)

ANALYTES	Trip Spike TS1
BTEX	
Benzene	89%
Toluene	99%
Ethyl Benzene	94%
Xylenes	88%

Note : results are reported as percentage recovery of known spike concentrations

TABLE C1
DUPLICATE SAMPLE
(Ref No: 13757/2-AA)

ANALYTES	TP20 0-0.15m mg/kg	Duplicate D1 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	5	6	18
Cadmium	<0.3	<0.3	-
Chromium	13	11	17
Copper	13	18	32
Lead	54	62	14
Mercury	0.08	0.09	12
Nickel	4.1	3.6	13
Zinc	68	63	8
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	33	<25	-
F3 (>C16-C34)	<90	310	-
F4 (>C34-C40)	<120	<120	-
BTEX			
Benzene	<0.1	<0.1	-
Toluene	<0.1	<0.1	-
Ethyl Benzene	<0.1	<0.1	-
Xylenes	<0.3	<0.3	-
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	<0.3	6.3	-
Total PAH	2	26	171
Naphthalene	<0.1	<0.1	
Benzo(a)Pyrene	<0.1	4.9	-
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.15	-
Endrin	<0.2	<0.2	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	<0.1	-
Endosulfan (alpha, beta & sulphate)	<0.5	<0.5	-
DDD+DDE+DDT	<0.6	<0.6	-
Chlordane (alpha & gamma)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<1	-

TABLE C2
DUPLICATE SAMPLE
(Ref No: 13757/2-AA)

ANALYTES	TP25 0-0.15m mg/kg	Duplicate D2 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	3	<3	-
Cadmium	0.8	0.7	13
Chromium	7.1	6.3	12
Copper	14	10	33
Lead	23	26	12
Mercury	0.02	0.03	40
Nickel	2.7	1.9	35
Zinc	56	53	6
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.15	-
Endrin	<0.2	<0.2	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	<0.1	-
Endosulfan (alpha, beta & sulphate)	<0.5	<0.5	-
DDD+DDE+DDT	<0.6	<0.6	-
Chlordane (alpha & gamma)	<0.2	<0.2	-

TABLE C3
DUPLICATE SAMPLE
(Ref No: 13757/2-AA)

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ANALYTES	TP24 0.5-0.8m mg/kg	Duplicate D3 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	4	4	0
Cadmium	<0.3	<0.3	-
Chromium	14	19	30
Copper	1.5	2.6	54
Lead	16	19	17
Mercury	<0.01	0.02	-
Nickel	0.8	1.2	40
Zinc	3.4	12	112

TABLE C4
DUPLICATE SAMPLE
(Ref No: 13757/2-AA)

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ANALYTES	TP19 1.55-1.65m mg/kg	Duplicate D4 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	6	6	0
Cadmium	<0.3	<0.3	-
Chromium	7.8	8.6	10
Copper	8.7	8.4	4
Lead	32	31	3
Mercury	0.05	0.06	18
Nickel	2.7	3.1	14
Zinc	60	43	33

TABLE D1
SPLIT SAMPLE
(Ref No: 13757/2-AA)

ANALYTES	TP11 0-0.15m mg/kg (SGS)	Split Sample S1 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	4	<4	-
Cadmium	<0.3	<0.4	-
Chromium	8.9	8	11
Copper	6.6	5	28
Lead	18	21	15
Mercury	0.05	<0.1	-
Nickel	3.6	2	57
Zinc	44	38	15
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.2	-
Endrin	<0.2	<0.1	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	-	-
Endosulfan (alpha (I), beta (II) & sulphate)	<0.5	<0.3	-
DDD+DDE+DDT	<0.6	<0.3	-
Chlordane (alpha & gamma)	<0.2	<0.2	-

TABLE D2
SPLIT SAMPLE
(Ref No: 13757/2-AA)

ANALYTES	TP13 0-0.15m mg/kg (SGS)	Split Sample S2 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	24	18	29
Cadmium	<0.3	<0.4	-
Chromium	44	30	38
Copper	62	27	79
Lead	45	24	61
Mercury	0.03	<0.1	-
Nickel	11	6	59
Zinc	210	93	77
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.2	-
Endrin	<0.2	<0.1	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	-	-
Endosulfan (alpha (I), beta (II) & sulphate)	<0.5	<0.3	-
DDD+DDE+DDT	<0.6	<0.3	-
Chlordane (alpha & gamma)	<0.2	<0.2	-

TABLE D3
SPLIT SAMPLE
(Ref No: 13757/2-AA)

ANALYTES	TP26 0-0.15m mg/kg (SGS)	Split Sample S3 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	3	<4	-
Cadmium	<0.3	<0.4	-
Chromium	6.3	5	23
Copper	15	10	40
Lead	21	15	33
Mercury	0.02	<0.1	-
Nickel	2.2	2	10
Zinc	47	35	29

TABLE D4
SPLIT SAMPLE
(Ref No: 13757/2-AA)

ANALYTES	TP27 0.35-0.45m mg/kg (SGS)	Split Sample S4 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	<3	<4	-
Cadmium	<0.3	<0.4	-
Chromium	6.6	7	6
Copper	1	<1	-
Lead	10	9	11
Mercury	0.03	<0.1	-
Nickel	3.2	4	22
Zinc	7.3	7	4

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TABLE E1

METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS

DISCRETE SAMPLES

(Ref No: 13757/2-AA)

Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
Fill Samples											
BH1	0-0.1	4	<0.3	14	17	21	0.04	10	62	18	7.4
TP5	0-0.15	4	<0.3	8.8	17	31	0.05	4.3	54	-	-
TP5	0.5-0.8	<3	<0.3	7.7	8.0	20	0.03	2.3	32	13	8.3
BH7	0-0.15	5	0.3	16	13	41	0.07	2.2	66	5.7	6.2
BH7	0.3-0.6	4	<0.3	11	5.3	18	<0.01	1.2	13	6.6	6.2
BH8	0-0.15	6	0.4	20	15	55	0.10	2.4	63	-	-
BH8	0.2-0.5	4	<0.3	13	5.3	22	0.02	1.3	11	-	-
TP10	0-0.15	3	<0.3	6.5	17	24	0.05	2.8	60	-	-
TP10	0.5-0.8	<3	<0.3	7.6	11	18	0.04	2.3	26	-	-
TP10	1.0-1.3	3	<0.3	7.5	7.5	19	0.03	2.3	27	-	-
TP10	1.5-1.8	<3	<0.3	7.9	6.4	18	0.03	2.2	29	-	-
TP11	0-0.15	4	<0.3	8.9	6.6	18	0.05	3.6	44	6.1	7.6
TP11	0.5-0.8	3	<0.3	7.5	9.0	19	0.03	1.7	38	9.7	8.0
TP11	1.0-1.3	<3	<0.3	8.0	7.5	20	0.03	2.2	34	-	-
TP13	0-0.15	24	<0.3	44	62	45	0.03	11	210	34	8.7
TP13	0.2-0.5	5	<0.3	13	4.9	22	0.03	1.8	42	-	-
TP14	0-0.15	3	<0.3	8.7	11	32	0.03	3.3	160	-	-
TP14	0.5-0.8	4	<0.3	17	1.8	16	<0.01	0.6	6.4	11	7.7
TP16	0-0.15	4	<0.3	8.5	8.1	27	0.06	2.2	67	-	-
TP16	0.5-0.8	<3	<0.3	7.5	7.4	20	0.03	2.0	24	-	-
TP16	1.0-1.3	4	<0.3	8.2	9.7	17	0.04	2.3	28	-	-
TP16	1.5-1.8	3	<0.3	8.0	6.7	19	0.04	2.2	27	-	-
TP16	2.0-2.2	<3	<0.3	7.7	7.1	22	0.03	2.1	27	-	-
TP17	0-0.15	<3	<0.3	4.5	4.8	15	0.04	1.8	35	4.2	7.9
TP17	0.5-0.8	4	<0.3	9.9	5.2	11	0.01	1.6	14	6.5	7.0
TP17	1.0-1.3	<3	<0.3	7.9	7.4	18	0.04	2.1	26	-	-
TP17	1.5-1.8	<3	<0.3	8.0	6.9	19	0.04	2.6	30	-	-
TP19	0-0.15	<3	<0.3	7.6	8.7	27	0.03	3.0	43	24	8.6
TP19	0.5-0.8	13	<0.3	15	17	55	0.01	2.2	24	-	-
TP19	1.0-1.3	6	<0.3	13	5.0	24	0.02	1.9	68	-	-
TP20	0-0.15	5	<0.3	13	13	54	0.08	4.1	68	8.4	7.7
TP20	0.5-0.8	5	<0.3	11	9.5	21	0.02	1.8	16	-	-
TP20	1.0-1.3	4	<0.3	5.3	4.0	15	0.04	1.7	38	-	-
TP24	0-0.15	4	0.3	11	8.6	34	0.02	2.7	33	-	-
TP24	0.5-0.8	4	<0.3	14	1.5	16	<0.01	0.8	3.4	-	-
TP24	1.0-1.3	<3	<0.3	7.2	9.7	15	0.02	0.8	7.5	-	-
TP25	0-0.15	3	0.8	7.1	14	23	0.02	2.7	56	-	-
TP25	0.5-0.8	14	**3.5**	22	15	59	0.03	3.8	45	11	7.9
TP25	1.0-1.3	8	**4.7**	18	41	46	0.06	4.5	130	-	-
TP25	1.5-1.8	16	2.8	23	83	58	0.05	6.2	130	-	-
TP26	0-0.15	3	<0.3	6.3	15	21	0.02	2.2	47	4.2	6.8
TP27	0-0.15	<3	<0.3	10	20	32	0.05	2.5	42	-	-
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5	0.02	-
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL) A - Residential A		100	20	100	6000	300	10	400	7400		
Ecological Investigation Levels (EIL) - Urban residential		100	-	190	95	1100	-	25	280		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				1				

Notes:
a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
b: EIL of aged nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=4.2 cmolc/kg and pH=6.2 were selected for derivation of EIL.
EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
c: Chromium (VI)
d: Methyl Mercury
e: Generic EIL for aged arsenic
f: Chromium (III), clay content was assumed =1%, a conservative assumption
g: Generic EIL for aged lead

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TABLE E2
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13757/2-AA)

Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
Natural Soil											
BH1	0.15-0.25	3	0.3	17	18	25	0.03	17	53	10	8.0
BH2	0-0.15	5	0.4	9.2	48	75	0.04	4.5	220	13	7.4
BH3	0-0.15	6	0.3	17	11	26	0.05	1.6	56	-	-
BH4	0-0.15	6	0.5	13	15	30	0.03	1.9	110	4.5	6.6
BH6	0-0.15	3	0.3	8.4	12	49	0.08	2.1	140	-	-
TP9	0-0.15	7	0.7	28	23	28	0.06	8.4	170	18	7.7
TP12	0-0.15	6	0.3	10	12	25	0.03	1.4	67	-	-
TP15	0-0.15	11	<0.3	7.7	14	32	0.17	1.0	34	6.1	6.8
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5	0.02	-
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL) A - Residential A		100	20	100	6000	300	10	400	7400		
Ecological Investigation Levels (EIL) - Urban residential		100	-	190	100	1100	-	30	290		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				1				

Notes:
a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
b: EIL of aged nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=4.5 cmolc/kg and pH=6.6 were selected for derivation of EIL.
EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
c: Chromium (VI)
d: Methyl Mercury
e: Generic EIL for aged arsenic
f: Chromium (III), clay content was assumed =1%, a conservative assumpt
g: Generic EIL for aged lead

TABLE E3
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13757/2-AA)

Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
Natural Soil											
TP5	1.05-1.15	<3	<0.3	3.5	0.9	7	0.02	<0.5	3.2	2.1	7.3
TP10	1.85-1.95	9	<0.3	8.5	8.2	18	0.02	2.0	19	12	8.4
TP11	1.45-1.55	3	<0.3	6.5	3.5	13	0.02	1.4	15	-	-
TP13	0.55-0.65	4	<0.3	8.7	20	21	0.02	3.3	49	6.7	7.6
TP14	1.05-1.15	4	<0.3	12	15	28	0.05	4.0	58	-	-
TP16	2.25-2.35	<3	<0.3	5.9	2.4	11	0.01	1.1	10	-	-
TP17	2.05-2.15	9	0.3	14	0.6	19	<0.01	2.3	9.0	7.2	5.3
TP18	0-0.15	5	<0.3	11	17	31	0.07	2.3	74	7.2	6.2
TP19	1.55-1.65	6	<0.3	7.8	8.7	32	0.05	2.7	60	-	-
TP20	1.55-1.65	8	<0.3	7.5	17	26	0.05	1.8	64	-	-
TP21	0-0.15	8	0.3	9.8	11	28	0.05	4.8	40	-	-
TP22	0-0.15	6	<0.3	7.3	13	31	0.06	2.3	40	5.1	6.3
TP23	0-0.15	10	<0.3	13	19	43	0.08	6.3	57	-	-
TP24	1.55-1.65	10	0.4	20	36	39	0.05	6.9	98	-	-
TP25	1.85-1.95	4	<0.3	13	4.4	16	0.03	4.6	15	-	-
TP26	0.25-0.35	7	<0.3	6.7	13	22	0.04	1.5	32	-	-
TP27	0.35-0.45	<3	<0.3	6.6	1.0	10	0.03	3.2	7.3	-	-
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5	0.02	-
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL) A - Residential A		100	20	100	6000	300	10	400	7400		
Ecological Investigation Levels (EIL) - Urban residential		100	-	190	55	1100	-	9	160		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				1				

Notes:
a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
b: EIL of aged nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=2.1 cmolc/kg and pH=5.3 were selected for derivation of EIL.
EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
c: Chromium (VI)
d: Methyl Mercury
e: Generic EIL for aged arsenic
f: Chromium (III), clay content was assumed =1%, a conservative assump
g: Generic EIL for aged lead

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TABLE F
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13757/2-AA)

												NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)																	
			TPH (mg/kg)					BTEX (mg/kg)				Health Screening Levels (HSL) A Low density residential						Ecological Screening Levels for fine-grained soil Urban residential								Ecological Screening Levels for coarse-grained soil Urban residential							
Sample Location	Depth (m)	Soil type	F1	F2*	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2*	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
BH1	0.15-0.25	silt	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	40	230	0.6	390	NL	95	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP5	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP5	1.05-1.15	silt	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	65	NL	0.7	NL	NL	210	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP10	0-0.15	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP10	1.85-1.95	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	90	NL	1	NL	NL	310	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP11	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP13	0.2-0.5	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP13	0.55-0.65	silt	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	40	230	0.6	390	NL	95	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP14	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP16	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP17	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP17	2.05-2.15	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	150	NL	2	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP19	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP20	0-0.15	clay	<25	33	33	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
Duplicate D1 (TP20 0-0.15m)		clay	<25	<25	<25	310	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP24	0-0.15	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP25	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
Limits of Reporting (LOR)			25	-	25	90	120	0.1	0.1	0.1	0.3																						

Notes:
F1: C6-C10 less BTEX
F2*: >C10-C16 less Naphthalene
F2**: >C10-C16
F3: >C16-C34
F4: >C34-C40
NL: Not Limiting

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TABLE G

POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TEST RESULTS

DISCRETE SAMPLES

(Ref No: 13757/2-AA)

			PAH (mg/kg)				NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
							Health-based Investigation Levels (HIL) A[a] - Residential A		Health Screening Level (HSL) A - Low density residential	Generic Ecological Investigation Level (EIL) - Urban residential	Ecological Screening Level (ESL) - Urban residential
Sample Location	Depth (m)	Soil type	BaP TEQ	TOTAL PAHs	NAPHTHALENE	BENZO(a)PYRENE (BaP)	BaP TEQ	TOTAL PAHs	NAPHTHALENE	NAPHTHALENE	BENZO(a)PYRENE (BaP)
BH1	0-0.1	silt	<0.3	<0.8	<0.1	0.1	3	300	4	170	0.7
BH1	0.15-0.25	silt	1.0	6.4	<0.1	0.7	3	300	4	170	0.7
TP5	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP5	1.05-1.15	silt	<0.3	<0.8	<0.1	<0.1	3	300	NL	170	0.7
BH7	0.3-0.6	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
BH8	0.2-0.5	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP10	0-0.15	clay	0.6	3.4	<0.1	0.4	3	300	5	170.0	0.7
TP10	1.85-1.95	clay	<0.3	<0.8	<0.1	<0.1	3	300	NL	170	0.7
TP11	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP13	0.2-0.5	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170.0	0.7
TP13	0.55-0.65	silt	<0.3	<0.8	<0.1	<0.1	3	300	4	170.0	0.7
TP14	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170.0	0.7
TP16	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170.0	0.7
TP17	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP17	2.05-2.15	clay	<0.3	<0.8	<0.1	<0.1	3	300	NL	170	0.7
TP19	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP20	0-0.15	clay	<0.3	2.0	<0.1	<0.1	3	300	5	170	0.7
Duplicate D1 (TP20 0-0.15m)		clay	**6.3**	26	<0.1	**4.9**	3	300	5	170	0.7
TP24	0-0.15	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP25	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
Limits of Reporting (LOR)			0.3	0.8	0.1	0.1					

Notes: a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.

NL: Not Limimting

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TABLE H
ORGANOCHLORINE PESTICIDES (OCP) & POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13757/2-AA)

Sample Location	Depth (m)	OCP (mg/kg)										(mg/kg)
		HEXACHLOROBENZENE (HCB)	HEPTACHLOR	ALDRIN+DIELDRIN	ENDRIN	METHOXYCHLOR	MIREX	ENDOSULFAN (alpha, beta & sulphate)	DDD+DDE+DDT	DDT	CHLORDANE (alpha & gamma)	PCB
BH1	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
BH1	0.15-0.25	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
BH2	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
BH3	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
BH4	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP5	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP5	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP5	1.05-1.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
BH6	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
BH7	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
BH8	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP9	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	1.9	0.9	<0.2	-
TP10	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP10	1.85-1.95	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP11	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP11	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP12	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP13	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP13	0.2-0.5	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP13	0.55-0.65	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP14	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP14	0.5-0.8	<0.1	<0.1	0.26	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP15	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP16	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP16	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP17	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP17	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP17	2.05-2.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP18	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP19	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP19	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP20	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP21	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP22	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP23	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP24	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP25	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP25	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP26	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
TP27	0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	-
Limits of Reporting (LOR)		0.1	0.1	0.15	0.2	0.1	0.1	0.5	0.6	0.2	0.2	1
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)												
Health-based Investigation Levels (HIL) [a] A - Residential A		10	6	6	10	300	10	270	240		###	1
Ecological Investigation Levels (EIL) - Urban residential										180 [b]		

Notes: a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.

b: Generic EIL for DDT

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TABLE I

ASBESTOS TEST RESULTS

DISCRETE SAMPLES

(Ref No: 13757/2-AA)

Sample Location	Depth (m)	ASBESTOS
Soil Samples		
BH1	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
BH1	0.15-0.25	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP5	1.05-1.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP10	1.85-1.95	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP13	0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP13	0.55-0.65	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP14	0-0.15	**Friable Chrysotile found (0.022% w/w)**
TP17	2.05-2.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP24	0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP25	0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP25	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP25	1.0-1.3	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP25	1.5-1.8	**Friable Chrysotile found (0.004% w/w)**
TP26	0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
FCP1	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
FCP2	0-0.1	**Friable Chrysotile found (0.007% w/w)**
Fibro-cement Pieces		
TP25	0.5-0.8	No Asbestos Detected
TP25	1.0-1.3	No Asbestos Detected
TP25	1.5-1.8	**Amosite & Chrysotile Asbestos Detected**
FCP1	Ground Surface	No Asbestos Detected
FCP2	Ground Surface	**Chrysotile Asbestos Detected**

APPENDIX A

TABLE 1 - TEST PIT, BOREHOLE & SAMPLE LOGS

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Development**	**Job No**	**13757/2**
Location	**Lots 2 & 3 in DP1115877**	**Refer to Drawing No**	**13757/2-AA1**
	53A & 53B Warriewood Road, Warriewood	**Logged & Sampled by**	**JH**

TABLE 1

TP/BH	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
BH1	0.0-0.1	0.0-0.1	31/05/2016		FILL: Clayey Silt, fine grained, brown	
	0.1-0.5	0.15-0.25			(ML) Clayey SILT, fine grained, dark brown	
BH2	0.0-0.5	0.0-0.15 0.2-0.3	31/05/2016		(ML) Clayey SILT, fine grained, dark brown	
BH3	0.0-0.5	0.0-0.15 0.2-0.3	31/05/2016		(ML) Clayey SILT, fine grained, dark brown	
BH4	0.0-0.5	0.0-0.15 0.2-0.3	31/05/2016		(ML) Clayey SILT, fine grained, dark brown	
TP5	0.0-0.5	0.0-0.15	31/05/2016		FILL: Clayey Silt, fine grained, brown	
	0.5-1.0	0.5-0.8			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	1.0-1.5	1.05-1.15			(ML) Sandy SILT, fine grained, pale grey	
BH6	0.0-0.5	0.0-0.15 0.2-0.3	31/05/2016		(ML) Clayey SILT, fine grained, dark brown	
BH7	0.0-0.3	0.0-0.15	31/05/2016		FILL: Clayey Silt, fine grained, brown	
	0.3-0.8	0.3-0.6			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	0.8	NS			Refusal	
BH8	0.0-0.15	0.0-0.15	31/05/2016		FILL: Clayey Silt, fine grained, brown	
	0.15-0.7	0.2-0.5			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	0.7	NS			Refusal	
TP9	0.0-0.5	0.0-0.15 0.2-0.3	30/05/2016		(ML) Clayey SILT, fine grained, dark brown	
TP10	0.0-1.8	0.0-0.15 0.5-0.8 1.0-1.3 1.5-1.8	30/05/2016		FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	1.8-2.3	1.85-1.95			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	

NS = No Sample

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Containing Material (ACM), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Development**	**Job No**	**13757/2**
Location	**Lots 2 & 3 in DP1115877**	**Refer to Drawing No**	**13757/2-AA1**
	53A & 53B Warriewood Road, Warriewood	**Logged & Sampled by**	**JH**

TABLE 1

TP/BH	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP11	0.0-0.5	0.0-0.15	31/05/2016		FILL: Clayey Silt, fine grained, brown	
	0.5-1.4	0.5-0.8 1.0-1.3			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	1.4-1.6	1.45-1.55			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
	1.6-1.9	NS			(CI-CH) CLAY, medium to high plasticity, brown-grey	
TP12	0.0-0.5	0.0-0.15 0.2-0.3	30/05/2016		(ML) Clayey SILT, fine grained, dark brown	
TP13	0.0-0.2	0.0-0.15	30/05/'2016		FILL: Sandy Silt, fine grained, brown, inclusion of gravel, inclusion of gravel	
	0.2-0.5	0.2-0.5			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	0.5-1.0	0.55-0.65			(ML) Sandy SILT, fine grained, dark brown	
TP14	0.0-0.5	0.0-0.15	30/05/2016		FILL: Sandy Silt, fine grained, brown, inclusion of cobbles/gravel	
	0.5-1.0	0.5-0.8			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	1.0-1.5	1.05-1.15			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP15	0.0-0.5	0.0-0.15 0.2-0.3	30/05/2016		(ML) Clayey SILT, fine grained, dark brown	
TP16	0.0-0.5	0.0-0.15	31/05/2016		FILL: Clayey Silt, fine grained, brown	
	0.5-2.2	0.5-0.8 1.0-1.3 1.5-1.8 2.0-2.2			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	2.2-2.7	2.25-2.35			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP17	0.0-0.5	0.0-0.15	31/05/2016		FILL: Clayey Silt, fine grained, brown	
	0.5-2.0	0.5-0.8 1.0-1.3 1.5-1.8			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	2.0-2.5	2.05-2.15			(CI-CH) CLAY, medium to high plasticity, brown-grey	

NS = No Sample
*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Containing Material (ACM), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Development**	**Job No**	**13757/2**
Location	**Lots 2 & 3 in DP1115877**	**Refer to Drawing No**	**13757/2-AA1**
	53A & 53B Warriewood Road, Warriewood	**Logged & Sampled by**	**JH**

TABLE 1

TP/BH	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP18	0.0-0.5	0.0-0.15 0.2-0.3	30/05/2016		(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP19	0.0-0.5	0.0-0.15	30/05/2016		FILL: Sandy Silt, fine grained, brown, inclusion of gravel	
	0.5-1.5	0.5-0.8 1.0-1.3			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	1.5-2.0	1.55-1.65			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP20	0.0-1.5	0.0-0.15 0.5-0.8 1.0-1.3	30/05/2016		FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	1.5-2.0	1.55-1.65			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP21	0.0-0.5	0.0-0.15 0.2-0.3	30/05/2016		(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP22	0.0-0.5	0.0-0.15 0.2-0.3	30/05/2016		(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP23	0.0-0.5	0.0-0.15 0.2-0.3	30/05/2016		(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP24	0.0-1.5	0.0-0.15 0.5-0.8 1.0-1.3	30/05/2016		FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles and silt	
	1.5-2.0	1.55-1.65			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP25	0.0-0.5	0.0-0.15	30/05/2016		FILL: Sandy Silt, fine grained, brown, inclusion of gravel	
	0.5-1.0	0.5-0.8			FILL: Clay, medium plasticity, brown, inclusion of gravel, cobbles, silt, building material, bricks and fibro-cement pieces	
	1.0-1.8	1.0-1.3 1.5-1.8			FILL: Silty Sandy Clay, low plasticity, dark grey, inclusion of branches, building material, bricks, fibro-cement pieces Seepage at 1.5m	
	1.8-2.3	1.85-1.95			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	

NS = No Sample
*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Containing Material (ACM), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Development**	**Job No**	**13757/2**
Location	**Lots 2 & 3 in DP1115877**	**Refer to Drawing No**	**13757/2-AA1**
	53A & 53B Warriewood Road, Warriewood	**Logged & Sampled by**	**JH**

TABLE 1

TP/BH	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP26	0.0-0.2	0.0-0.15	30/05/2016		FILL: Sandy Silt, fine grained, brown, inclusion of gravel	
	0.2-0.7	0.25-0.35			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
TP27	0.0-0.3	0.0-0.15	30/05/2016		FILL: Sandy Silt, fine grained, brown, inclusion of gravel	
	0.3-0.8	0.35-0.45			(CL) Silty Sandy CLAY, low plasticity, dark grey-brown	
Sample						
FCP1	0.0-0.1	0.0-0.1	30/05/2016		FILL: Sandy Silt, fine grained, brown, inclusion of gravel	One (1) fibro-cement piece found on ground surface
FCP2	0.0-0.1	0.0-0.1	7/06 /2016		(ML) Sandy SILT, fine grained, dark brown,	One (1) fibro-cement piece found on ground surface

NS = No Sample
*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Containing Material (ACM), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

APPENDIX B

SGS ENVIRONMENTAL SERVICES ANALYTICAL REPORTS
AND
ENVIROLAB SERVICES CERTIFICATE OF ANALYSIS

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood**
Order Number	(Not specified)
Samples	78

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	**SE153116 R0**
Date Received	1/6/2016
Date Reported	10/6/2016

COMMENTS

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

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

Sample #27: Asbestos found in 5x3mm cement sheet fragment, in >2 to <7mm fraction.
Sample #64: Asbestos found in 4x2mm cement sheet fragments, in >2 to <7mm fraction.

Samples #59, 61, 70 were ashed after initial stereo microscope examination, re-examined and trace analysis performed on samples where asbestos has not been detected.
No trace asbestos fibres detected using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Yusuf Kuthpudin
Asbestos Analyst

VOC's in Soil [AN433/AN434] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018
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	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032
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	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054
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	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	Duplicate D1 SOIL - 30/5/2016 SE153116.072	Tripspike TS1 SOIL - 30/5/2016 SE153116.078
Benzene	mg/kg	0.1	<0.1	<0.1	[89%]
Toluene	mg/kg	0.1	<0.1	<0.1	[99%]
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	[94%]
m/p-xylene	mg/kg	0.2	<0.2	<0.2	[88%]
o-xylene	mg/kg	0.1	<0.1	<0.1	[93%]
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	-
Total BTEX	mg/kg	0.6	<0.6	<0.6	-
Naphthalene	mg/kg	0.1	<0.1	<0.1	-

Volatile Petroleum Hydrocarbons in Soil [AN433/AN434/AN410] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018
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	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032
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	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054
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	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	Duplicate D1 SOIL - 30/5/2016 SE153116.072
TRH C6-C9	mg/kg	20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054
TRH C10-C14	mg/kg	20	<20	<20	<20	**28**	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	**65**	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	**33**	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	**33**	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	Duplicate D1 SOIL - 30/5/2016 SE153116.072
TRH C10-C14	mg/kg	20	<20	<20
TRH C15-C28	mg/kg	45	<45	**150**
TRH C29-C36	mg/kg	45	<45	**200**
TRH C37-C40	mg/kg	100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	**310**
TRH >C34-C40 (F4)	mg/kg	120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	**360**
TRH C10-C40 Total	mg/kg	210	<210	**360**

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018
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	**0.2**	<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	**0.2**	<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	**1.4**	<0.1	<0.1	**0.4**	<0.1
Pyrene	mg/kg	0.1	**1.4**	<0.1	<0.1	**0.6**	<0.1
Benzo(a)anthracene	mg/kg	0.1	**0.6**	<0.1	<0.1	**0.3**	<0.1
Chrysene	mg/kg	0.1	**0.5**	<0.1	<0.1	**0.4**	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	**0.7**	<0.1	<0.1	**0.6**	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	**0.3**	<0.1	<0.1	**0.2**	<0.1
Benzo(a)pyrene	mg/kg	0.1	**0.7**	<0.1	<0.1	**0.4**	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.5**	<0.1	<0.1	**0.2**	<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	**0.3**	<0.1	<0.1	**0.1**	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	**0.9**	<0.2	<0.2	**0.5**	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	**1.0**	<0.3	<0.3	**0.6**	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	**0.9**	<0.2	<0.2	**0.5**	<0.2
Total PAH (18)	mg/kg	0.8	**6.4**	<0.8	<0.8	**3.4**	<0.8

PARAMETER	UOM	LOR	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054
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	1.0	<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	0.4	<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	0.2	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.4	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	2.0	<0.8

PARAMETER	UOM	LOR	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	Duplicate D1 SOIL - 30/5/2016 SE153116.072
Naphthalene	mg/kg	0.1	<0.1	<0.1
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	<0.1	0.2
Acenaphthene	mg/kg	0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	0.6
Anthracene	mg/kg	0.1	<0.1	0.3
Fluoranthene	mg/kg	0.1	<0.1	2.2
Pyrene	mg/kg	0.1	<0.1	3.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	1.4
Chrysene	mg/kg	0.1	<0.1	1.4
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	3.6
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	2.2
Benzo(a)pyrene	mg/kg	0.1	<0.1	4.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	3.0
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0.3
Benzo(ghi)perylene	mg/kg	0.1	<0.1	2.5
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	6.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	6.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	6.3
Total PAH (18)	mg/kg	0.8	<0.8	26

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116.001	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	BH2 0-0.15 SOIL - 31/5/2016 SE153116.003	BH3 0-0.15 SOIL - 31/5/2016 SE153116.004	BH4 0-0.15 SOIL - 31/5/2016 SE153116.005
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	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP5 0-0.15 SOIL - 31/5/2016 SE153116.006	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	BH6 0-0.15 SOIL - 31/5/2016 SE153116.009	BH7 0-0.15 SOIL - 31/5/2016 SE153116.010
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	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	BH8 0-0.15 SOIL - 31/5/2016 SE153116.012	TP9 0-0.15 SOIL - 30/5/2016 SE153116.013	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018	TP11 0-0.15 SOIL - 30/5/2016 SE153116.019
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	**0.7**	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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	**0.2**	<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	**0.7**	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020	TP12 0-0.15 SOIL - 30/5/2016 SE153116.023	TP13 0-0.15 SOIL - 30/5/2016 SE153116.024	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026
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	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP14 0-0.15 SOIL - 30/5/2016 SE153116.027	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP15 0-0.15 SOIL - 30/5/2016 SE153116.030	TP16 0-0.15 SOIL - 31/5/2016 SE153116.031	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032
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	0.05	<0.05	**0.16**	<0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP17 0-0.15 SOIL - 31/5/2016 SE153116.037	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP18 0-0.15 SOIL - 30/5/2016 SE153116.042	TP19 0-0.15 SOIL - 30/5/2016 SE153116.043
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	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP21 0-0.15 SOIL - 30/5/2016 SE153116.051	TP22 0-0.15 SOIL - 30/5/2016 SE153116.052	TP23 0-0.15 SOIL - 30/5/2016 SE153116.053
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	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054	TP25 0-0.15 SOIL - 30/5/2016 SE153116.058	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	TP26 0-0.15 SOIL - 30/5/2016 SE153116.066	TP27 0-0.15 SOIL - 30/5/2016 SE153116.068
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	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	Duplicate D1 SOIL - 30/5/2016 SE153116.072	Duplicate D2 SOIL - 30/5/2016 SE153116.073
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	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1
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	0.05	<0.05	<0.05
Endrin	mg/kg	0.2	<0.2	<0.2
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	<0.1	<0.1
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

PCBs in Soil [AN400/AN420] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018
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	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032
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	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054
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 [AN400/AN420] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	Duplicate D1 SOIL - 30/5/2016 SE153116.072
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	<0.2	<0.2
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

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) [AN122] Tested: 7/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116.001	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	BH2 0-0.15 SOIL - 31/5/2016 SE153116.003	BH4 0-0.15 SOIL - 31/5/2016 SE153116.005	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007
Exchangeable Sodium, Na	mg/kg	2	9	25	23	19	61
Exchangeable Sodium, Na	meq/100g	0.01	0.04	0.11	0.10	0.08	0.27
Exchangeable Sodium Percentage*	%	0.1	0.2	1.1	0.8	1.8	2.1
Exchangeable Potassium, K	mg/kg	2	160	210	90	59	69
Exchangeable Potassium, K	meq/100g	0.01	0.42	0.53	0.23	0.15	0.18
Exchangeable Potassium Percentage*	%	0.1	2.3	5.3	1.8	3.4	1.4
Exchangeable Calcium, Ca	mg/kg	2	3000	1600	2200	730	2200
Exchangeable Calcium, Ca	meq/100g	0.01	15	7.8	11	3.6	11
Exchangeable Calcium Percentage*	%	0.1	83.0	77.6	86.7	81.4	88.0
Exchangeable Magnesium, Mg	mg/kg	2	320	200	160	73	130
Exchangeable Magnesium, Mg	meq/100g	0.02	2.6	1.6	1.3	0.60	1.1
Exchangeable Magnesium Percentage*	%	0.1	14.5	16.0	10.7	13.4	8.5
Cation Exchange Capacity	meq/100g	0.02	18	10	13	4.5	13

PARAMETER	UOM	LOR	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	BH7 0-0.15 SOIL - 31/5/2016 SE153116.010	BH7 0.3-0.6 SOIL - 31/5/2016 SE153116.011	TP9 0-0.15 SOIL - 30/5/2016 SE153116.013	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018
Exchangeable Sodium, Na	mg/kg	2	17	25	24	25	67
Exchangeable Sodium, Na	meq/100g	0.01	0.07	0.11	0.11	0.11	0.29
Exchangeable Sodium Percentage*	%	0.1	3.5	1.9	1.6	0.6	2.4
Exchangeable Potassium, K	mg/kg	2	18	130	160	190	72
Exchangeable Potassium, K	meq/100g	0.01	0.05	0.34	0.40	0.48	0.18
Exchangeable Potassium Percentage*	%	0.1	2.2	5.9	6.1	2.7	1.5
Exchangeable Calcium, Ca	mg/kg	2	350	770	850	3300	2200
Exchangeable Calcium, Ca	meq/100g	0.01	1.8	3.8	4.2	17	11
Exchangeable Calcium Percentage*	%	0.1	84.0	67.7	63.6	93.3	87.9
Exchangeable Magnesium, Mg	mg/kg	2	26	170	230	75	120
Exchangeable Magnesium, Mg	meq/100g	0.02	0.22	1.4	1.9	0.62	1.0
Exchangeable Magnesium Percentage*	%	0.1	10.3	24.5	28.7	3.4	8.2
Cation Exchange Capacity	meq/100g	0.02	2.1	5.7	6.6	18	12

PARAMETER	UOM	LOR	TP11 0-0.15 SOIL - 30/5/2016 SE153116.019	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020	TP13 0-0.15 SOIL - 30/5/2016 SE153116.024	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028
Exchangeable Sodium, Na	mg/kg	2	30	77	95	64	47
Exchangeable Sodium, Na	meq/100g	0.01	0.13	0.33	0.41	0.28	0.20
Exchangeable Sodium Percentage*	%	0.1	2.2	3.4	1.2	4.1	1.8
Exchangeable Potassium, K	mg/kg	2	39	48	250	41	110
Exchangeable Potassium, K	meq/100g	0.01	0.10	0.12	0.63	0.10	0.28
Exchangeable Potassium Percentage*	%	0.1	1.7	1.3	1.9	1.5	2.5
Exchangeable Calcium, Ca	mg/kg	2	1000	1600	6300	1000	1700
Exchangeable Calcium, Ca	meq/100g	0.01	5.2	8.1	32	5.1	8.7
Exchangeable Calcium Percentage*	%	0.1	85.2	84.2	94.1	76.0	77.8
Exchangeable Magnesium, Mg	mg/kg	2	81	130	120	150	240
Exchangeable Magnesium, Mg	meq/100g	0.02	0.66	1.1	0.95	1.2	2.0
Exchangeable Magnesium Percentage*	%	0.1	11.0	11.1	2.8	18.3	17.9
Cation Exchange Capacity	meq/100g	0.02	6.1	9.7	34	6.7	11

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) [AN122] Tested: 7/6/2016 (continued)

PARAMETER	UOM	LOR	TP15 0-0.15 SOIL - 30/5/2016 SE153116.030	TP17 0-0.15 SOIL - 31/5/2016 SE153116.037	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP18 0-0.15 SOIL - 30/5/2016 SE153116.042
Exchangeable Sodium, Na	mg/kg	2	39	12	71	340	85
Exchangeable Sodium, Na	meq/100g	0.01	0.17	0.05	0.31	1.5	0.37
Exchangeable Sodium Percentage*	%	0.1	2.8	1.2	4.8	20.3	5.1
Exchangeable Potassium, K	mg/kg	2	39	40	71	79	34
Exchangeable Potassium, K	meq/100g	0.01	0.10	0.10	0.18	0.20	0.09
Exchangeable Potassium Percentage*	%	0.1	1.6	2.4	2.8	2.8	1.2
Exchangeable Calcium, Ca	mg/kg	2	850	740	940	430	1000
Exchangeable Calcium, Ca	meq/100g	0.01	4.2	3.7	4.7	2.1	5.1
Exchangeable Calcium Percentage*	%	0.1	70.2	88.6	72.0	29.7	70.8
Exchangeable Magnesium, Mg	mg/kg	2	190	40	160	410	200
Exchangeable Magnesium, Mg	meq/100g	0.02	1.5	0.32	1.3	3.4	1.7
Exchangeable Magnesium Percentage*	%	0.1	25.4	7.7	20.5	47.2	22.9
Cation Exchange Capacity	meq/100g	0.02	6.1	4.2	6.5	7.2	7.2

PARAMETER	UOM	LOR	TP19 0-0.15 SOIL - 30/5/2016 SE153116.043	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP22 0-0.15 SOIL - 30/5/2016 SE153116.052	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	TP26 0-0.15 SOIL - 30/5/2016 SE153116.066
Exchangeable Sodium, Na	mg/kg	2	28	17	140	34	21
Exchangeable Sodium, Na	meq/100g	0.01	0.12	0.07	0.60	0.15	0.09
Exchangeable Sodium Percentage*	%	0.1	0.5	0.9	11.8	1.3	2.2
Exchangeable Potassium, K	mg/kg	2	88	59	38	84	29
Exchangeable Potassium, K	meq/100g	0.01	0.23	0.15	0.10	0.21	0.07
Exchangeable Potassium Percentage*	%	0.1	0.9	1.8	1.9	1.9	1.8
Exchangeable Calcium, Ca	mg/kg	2	4600	1500	690	2000	660
Exchangeable Calcium, Ca	meq/100g	0.01	23	7.3	3.5	9.9	3.3
Exchangeable Calcium Percentage*	%	0.1	97.2	87.7	67.7	88.9	78.9
Exchangeable Magnesium, Mg	mg/kg	2	39	98	120	110	87
Exchangeable Magnesium, Mg	meq/100g	0.02	0.32	0.80	0.95	0.87	0.71
Exchangeable Magnesium Percentage*	%	0.1	1.4	9.6	18.6	7.8	17.1
Cation Exchange Capacity	meq/100g	0.02	24	8.4	5.1	11	4.2

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 7/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116.001	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	BH2 0-0.15 SOIL - 31/5/2016 SE153116.003	BH3 0-0.15 SOIL - 31/5/2016 SE153116.004	BH4 0-0.15 SOIL - 31/5/2016 SE153116.005
Arsenic, As	mg/kg	3	4	3	5	6	6
Cadmium, Cd	mg/kg	0.3	<0.3	0.3	0.4	0.3	0.5
Chromium, Cr	mg/kg	0.3	14	17	9.2	17	13
Copper, Cu	mg/kg	0.5	17	18	48	11	15
Lead, Pb	mg/kg	1	21	25	75	26	30
Nickel, Ni	mg/kg	0.5	10	17	4.5	1.6	1.9
Zinc, Zn	mg/kg	0.5	62	53	220	56	110

PARAMETER	UOM	LOR	TP5 0-0.15 SOIL - 31/5/2016 SE153116.006	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	BH6 0-0.15 SOIL - 31/5/2016 SE153116.009	BH7 0-0.15 SOIL - 31/5/2016 SE153116.010
Arsenic, As	mg/kg	3	4	<3	<3	3	5
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	0.3	0.3
Chromium, Cr	mg/kg	0.3	8.8	7.7	3.5	8.4	16
Copper, Cu	mg/kg	0.5	17	8.0	0.9	12	13
Lead, Pb	mg/kg	1	31	20	7	49	41
Nickel, Ni	mg/kg	0.5	4.3	2.3	<0.5	2.1	2.2
Zinc, Zn	mg/kg	0.5	54	32	3.2	140	66

PARAMETER	UOM	LOR	BH7 0.3-0.6 SOIL - 31/5/2016 SE153116.011	BH8 0-0.15 SOIL - 31/5/2016 SE153116.012	TP9 0-0.15 SOIL - 30/5/2016 SE153116.013	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 0.5-0.8 SOIL - 30/5/2016 SE153116.015
Arsenic, As	mg/kg	3	4	6	7	3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	0.4	0.7	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	11	20	28	6.5	7.6
Copper, Cu	mg/kg	0.5	5.3	15	23	17	11
Lead, Pb	mg/kg	1	18	55	28	24	18
Nickel, Ni	mg/kg	0.5	1.2	2.4	8.4	2.8	2.3
Zinc, Zn	mg/kg	0.5	13	63	170	60	26

PARAMETER	UOM	LOR	TP10 1.0-1.3 SOIL - 30/5/2016 SE153116.016	TP10 1.5-1.8 SOIL - 30/5/2016 SE153116.017	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018	TP11 0-0.15 SOIL - 30/5/2016 SE153116.019	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020
Arsenic, As	mg/kg	3	3	<3	9	4	3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	7.5	7.9	8.5	8.9	7.5
Copper, Cu	mg/kg	0.5	7.5	6.4	8.2	6.6	9.0
Lead, Pb	mg/kg	1	19	18	18	18	19
Nickel, Ni	mg/kg	0.5	2.3	2.2	2.0	3.6	1.7
Zinc, Zn	mg/kg	0.5	27	29	19	44	38

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 7/6/2016 (continued)

PARAMETER	UOM	LOR	TP11 1.0-1.3 SOIL - 30/5/2016 SE153116.021	TP11 1.45-1.55 SOIL - 30/5/2016 SE153116.022	TP12 0-0.15 SOIL - 30/5/2016 SE153116.023	TP13 0-0.15 SOIL - 30/5/2016 SE153116.024	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025
Arsenic, As	mg/kg	3	<3	3	6	24	5
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	8.0	6.5	10	44	13
Copper, Cu	mg/kg	0.5	7.5	3.5	12	62	4.9
Lead, Pb	mg/kg	1	20	13	25	45	22
Nickel, Ni	mg/kg	0.5	2.2	1.4	1.4	11	1.8
Zinc, Zn	mg/kg	0.5	34	15	67	210	42

PARAMETER	UOM	LOR	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0-0.15 SOIL - 30/5/2016 SE153116.027	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP14 1.05-1.15 SOIL - 30/5/2016 SE153116.029	TP15 0-0.15 SOIL - 30/5/2016 SE153116.030
Arsenic, As	mg/kg	3	4	3	4	4	11
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	8.7	8.7	17	12	7.7
Copper, Cu	mg/kg	0.5	20	11	1.8	15	14
Lead, Pb	mg/kg	1	21	32	16	28	32
Nickel, Ni	mg/kg	0.5	3.3	3.3	0.6	4.0	1.0
Zinc, Zn	mg/kg	0.5	49	160	6.4	58	34

PARAMETER	UOM	LOR	TP16 0-0.15 SOIL - 31/5/2016 SE153116.031	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032	TP16 1.0-1.3 SOIL - 31/5/2016 SE153116.033	TP16 1.5-1.8 SOIL - 31/5/2016 SE153116.034	TP16 2.0-2.2 SOIL - 31/5/2016 SE153116.035
Arsenic, As	mg/kg	3	4	<3	4	3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	8.5	7.5	8.2	8.0	7.7
Copper, Cu	mg/kg	0.5	8.1	7.4	9.7	6.7	7.1
Lead, Pb	mg/kg	1	27	20	17	19	22
Nickel, Ni	mg/kg	0.5	2.2	2.0	2.3	2.2	2.1
Zinc, Zn	mg/kg	0.5	67	24	28	27	27

PARAMETER	UOM	LOR	TP16 2.25-2.35 SOIL - 31/5/2016 SE153116.036	TP17 0-0.15 SOIL - 31/5/2016 SE153116.037	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 1.0-1.3 SOIL - 31/5/2016 SE153116.039	TP17 1.5-1.8 SOIL - 31/5/2016 SE153116.040
Arsenic, As	mg/kg	3	<3	<3	4	<3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	5.9	4.5	9.9	7.9	8.0
Copper, Cu	mg/kg	0.5	2.4	4.8	5.2	7.4	6.9
Lead, Pb	mg/kg	1	11	15	11	18	19
Nickel, Ni	mg/kg	0.5	1.1	1.8	1.6	2.1	2.6
Zinc, Zn	mg/kg	0.5	10	35	14	26	30

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 7/6/2016 (continued)

PARAMETER	UOM	LOR	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP18 0-0.15 SOIL - 30/5/2016 SE153116.042	TP19 0-0.15 SOIL - 30/5/2016 SE153116.043	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP19 1.0-1.3 SOIL - 30/5/2016 SE153116.045
Arsenic, As	mg/kg	3	9	5	<3	13	6
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	14	11	7.6	15	13
Copper, Cu	mg/kg	0.5	0.6	17	8.7	17	5.0
Lead, Pb	mg/kg	1	19	31	27	55	24
Nickel, Ni	mg/kg	0.5	2.3	2.3	3.0	2.2	1.9
Zinc, Zn	mg/kg	0.5	9.0	74	43	24	68

PARAMETER	UOM	LOR	TP19 1.55-1.65 SOIL - 30/5/2016 SE153116.046	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP20 0.5-0.8 SOIL - 30/5/2016 SE153116.048	TP20 1.0-1.3 SOIL - 30/5/2016 SE153116.049	TP20 1.55-1.65 SOIL - 30/5/2016 SE153116.050
Arsenic, As	mg/kg	3	6	5	5	4	8
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	7.8	13	11	5.3	7.5
Copper, Cu	mg/kg	0.5	8.7	13	9.5	4.0	17
Lead, Pb	mg/kg	1	32	54	21	15	26
Nickel, Ni	mg/kg	0.5	2.7	4.1	1.8	1.7	1.8
Zinc, Zn	mg/kg	0.5	60	68	16	38	64

PARAMETER	UOM	LOR	TP21 0-0.15 SOIL - 30/5/2016 SE153116.051	TP22 0-0.15 SOIL - 30/5/2016 SE153116.052	TP23 0-0.15 SOIL - 30/5/2016 SE153116.053	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054	TP24 0.5-0.8 SOIL - 30/5/2016 SE153116.055
Arsenic, As	mg/kg	3	8	6	10	4	4
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	<0.3	0.3	<0.3
Chromium, Cr	mg/kg	0.3	9.8	7.3	13	11	14
Copper, Cu	mg/kg	0.5	11	13	19	8.6	1.5
Lead, Pb	mg/kg	1	28	31	43	34	16
Nickel, Ni	mg/kg	0.5	4.8	2.3	6.3	2.7	0.8
Zinc, Zn	mg/kg	0.5	40	40	57	33	3.4

PARAMETER	UOM	LOR	TP24 1.0-1.3 SOIL - 30/5/2016 SE153116.056	TP24 1.55-1.65 SOIL - 30/5/2016 SE153116.057	TP25 0-0.15 SOIL - 30/5/2016 SE153116.058	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	TP25 1.0-1.3 SOIL - 30/5/2016 SE153116.062
Arsenic, As	mg/kg	3	<3	10	3	14	8
Cadmium, Cd	mg/kg	0.3	<0.3	0.4	0.8	3.5	4.7
Chromium, Cr	mg/kg	0.3	7.2	20	7.1	22	18
Copper, Cu	mg/kg	0.5	9.7	36	14	15	41
Lead, Pb	mg/kg	1	15	39	23	59	46
Nickel, Ni	mg/kg	0.5	0.8	6.9	2.7	3.8	4.5
Zinc, Zn	mg/kg	0.5	7.5	98	56	45	130

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 7/6/2016 (continued)

PARAMETER	UOM	LOR	TP25 1.5-1.8 SOIL - 30/5/2016 SE153116.064	TP25 1.85-1.5 SOIL - 30/5/2016 SE153116.065	TP26 0-0.15 SOIL - 30/5/2016 SE153116.066	TP26 0.25-0.35 SOIL - 30/5/2016 SE153116.067	TP27 0-0.15 SOIL - 30/5/2016 SE153116.068
Arsenic, As	mg/kg	3	16	4	3	7	<3
Cadmium, Cd	mg/kg	0.3	2.8	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	23	13	6.3	6.7	10
Copper, Cu	mg/kg	0.5	83	4.4	15	13	20
Lead, Pb	mg/kg	1	58	16	21	22	32
Nickel, Ni	mg/kg	0.5	6.2	4.6	2.2	1.5	2.5
Zinc, Zn	mg/kg	0.5	130	15	47	32	42

PARAMETER	UOM	LOR	TP27 0.35-0.45 SOIL - 30/5/2016 SE153116.069	Duplicate D1 SOIL - 30/5/2016 SE153116.072	Duplicate D2 SOIL - 30/5/2016 SE153116.073	Duplicate D3 SOIL - 30/5/2016 SE153116.074	Duplicate D4 SOIL - 30/5/2016 SE153116.075
Arsenic, As	mg/kg	3	<3	6	<3	4	6
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.7	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	6.6	11	6.3	19	8.6
Copper, Cu	mg/kg	0.5	1.0	18	10	2.6	8.4
Lead, Pb	mg/kg	1	10	62	26	19	31
Nickel, Ni	mg/kg	0.5	3.2	3.6	1.9	1.2	3.1
Zinc, Zn	mg/kg	0.5	7.3	63	53	12	43

Mercury in Soil [AN312] Tested: 8/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116.001	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	BH2 0-0.15 SOIL - 31/5/2016 SE153116.003	BH3 0-0.15 SOIL - 31/5/2016 SE153116.004	BH4 0-0.15 SOIL - 31/5/2016 SE153116.005
Mercury	mg/kg	0.01	0.04	0.03	0.04	0.05	0.03

PARAMETER	UOM	LOR	TP5 0-0.15 SOIL - 31/5/2016 SE153116.006	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	BH6 0-0.15 SOIL - 31/5/2016 SE153116.009	BH7 0-0.15 SOIL - 31/5/2016 SE153116.010
Mercury	mg/kg	0.01	0.05	0.03	0.02	0.08	0.07

PARAMETER	UOM	LOR	BH7 0.3-0.6 SOIL - 31/5/2016 SE153116.011	BH8 0-0.15 SOIL - 31/5/2016 SE153116.012	TP9 0-0.15 SOIL - 30/5/2016 SE153116.013	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 0.5-0.8 SOIL - 30/5/2016 SE153116.015
Mercury	mg/kg	0.01	<0.01	0.10	0.06	0.05	0.04

PARAMETER	UOM	LOR	TP10 1.0-1.3 SOIL - 30/5/2016 SE153116.016	TP10 1.5-1.8 SOIL - 30/5/2016 SE153116.017	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018	TP11 0-0.15 SOIL - 30/5/2016 SE153116.019	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020
Mercury	mg/kg	0.01	0.03	0.03	0.02	0.05	0.03

PARAMETER	UOM	LOR	TP11 1.0-1.3 SOIL - 30/5/2016 SE153116.021	TP11 1.45-1.55 SOIL - 30/5/2016 SE153116.022	TP12 0-0.15 SOIL - 30/5/2016 SE153116.023	TP13 0-0.15 SOIL - 30/5/2016 SE153116.024	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025
Mercury	mg/kg	0.01	0.03	0.02	0.03	0.03	0.03

PARAMETER	UOM	LOR	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0-0.15 SOIL - 30/5/2016 SE153116.027	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP14 1.05-1.15 SOIL - 30/5/2016 SE153116.029	TP15 0-0.15 SOIL - 30/5/2016 SE153116.030
Mercury	mg/kg	0.01	0.02	0.03	<0.01	0.05	0.17

PARAMETER	UOM	LOR	TP16 0-0.15 SOIL - 31/5/2016 SE153116.031	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032	TP16 1.0-1.3 SOIL - 31/5/2016 SE153116.033	TP16 1.5-1.8 SOIL - 31/5/2016 SE153116.034	TP16 2.0-2.2 SOIL - 31/5/2016 SE153116.035
Mercury	mg/kg	0.01	0.06	0.03	0.04	0.04	0.03

Mercury in Soil [AN312] Tested: 8/6/2016 (continued)

PARAMETER	UOM	LOR	TP16 2.25-2.35 SOIL - 31/5/2016 SE153116.036	TP17 0-0.15 SOIL - 31/5/2016 SE153116.037	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 1.0-1.3 SOIL - 31/5/2016 SE153116.039	TP17 1.5-1.8 SOIL - 31/5/2016 SE153116.040
Mercury	mg/kg	0.01	0.01	0.04	0.01	0.04	0.04

PARAMETER	UOM	LOR	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP18 0-0.15 SOIL - 30/5/2016 SE153116.042	TP19 0-0.15 SOIL - 30/5/2016 SE153116.043	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP19 1.0-1.3 SOIL - 30/5/2016 SE153116.045
Mercury	mg/kg	0.01	<0.01	0.07	0.03	0.01	0.02

PARAMETER	UOM	LOR	TP19 1.55-1.65 SOIL - 30/5/2016 SE153116.046	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP20 0.5-0.8 SOIL - 30/5/2016 SE153116.048	TP20 1.0-1.3 SOIL - 30/5/2016 SE153116.049	TP20 1.55-1.65 SOIL - 30/5/2016 SE153116.050
Mercury	mg/kg	0.01	0.05	0.08	0.02	0.04	0.05

PARAMETER	UOM	LOR	TP21 0-0.15 SOIL - 30/5/2016 SE153116.051	TP22 0-0.15 SOIL - 30/5/2016 SE153116.052	TP23 0-0.15 SOIL - 30/5/2016 SE153116.053	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054	TP24 0.5-0.8 SOIL - 30/5/2016 SE153116.055
Mercury	mg/kg	0.01	0.05	0.06	0.08	0.02	<0.01

PARAMETER	UOM	LOR	TP24 1.0-1.3 SOIL - 30/5/2016 SE153116.056	TP24 1.55-1.65 SOIL - 30/5/2016 SE153116.057	TP25 0-0.15 SOIL - 30/5/2016 SE153116.058	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	TP25 1.0-1.3 SOIL - 30/5/2016 SE153116.062
Mercury	mg/kg	0.01	0.02	0.05	0.02	0.03	0.06

PARAMETER	UOM	LOR	TP25 1.5-1.8 SOIL - 30/5/2016 SE153116.064	TP25 1.85-1.5 SOIL - 30/5/2016 SE153116.065	TP26 0-0.15 SOIL - 30/5/2016 SE153116.066	TP26 0.25-0.35 SOIL - 30/5/2016 SE153116.067	TP27 0-0.15 SOIL - 30/5/2016 SE153116.068
Mercury	mg/kg	0.01	0.05	0.03	0.02	0.04	0.05

PARAMETER	UOM	LOR	TP27 0.35-0.45 SOIL - 30/5/2016 SE153116.069	Duplicate D1 SOIL - 30/5/2016 SE153116.072	Duplicate D2 SOIL - 30/5/2016 SE153116.073	Duplicate D3 SOIL - 30/5/2016 SE153116.074	Duplicate D4 SOIL - 30/5/2016 SE153116.075
Mercury	mg/kg	0.01	0.03	0.09	0.03	0.02	0.06

Moisture Content [AN002] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116.001	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	BH2 0-0.15 SOIL - 31/5/2016 SE153116.003	BH3 0-0.15 SOIL - 31/5/2016 SE153116.004	BH4 0-0.15 SOIL - 31/5/2016 SE153116.005
% Moisture	%w/w	0.5	14	7.5	14	13	17

PARAMETER	UOM	LOR	TP5 0-0.15 SOIL - 31/5/2016 SE153116.006	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116.007	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	BH6 0-0.15 SOIL - 31/5/2016 SE153116.009	BH7 0-0.15 SOIL - 31/5/2016 SE153116.010
% Moisture	%w/w	0.5	6.9	11	7.4	12	15

PARAMETER	UOM	LOR	BH7 0.3-0.6 SOIL - 31/5/2016 SE153116.011	BH8 0-0.15 SOIL - 31/5/2016 SE153116.012	TP9 0-0.15 SOIL - 30/5/2016 SE153116.013	TP10 0-0.15 SOIL - 30/5/2016 SE153116.014	TP10 0.5-0.8 SOIL - 30/5/2016 SE153116.015
% Moisture	%w/w	0.5	19	19	13	8.5	11

PARAMETER	UOM	LOR	TP10 1.0-1.3 SOIL - 30/5/2016 SE153116.016	TP10 1.5-1.8 SOIL - 30/5/2016 SE153116.017	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018	TP11 0-0.15 SOIL - 30/5/2016 SE153116.019	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116.020
% Moisture	%w/w	0.5	13	12	12	8.5	11

PARAMETER	UOM	LOR	TP11 1.0-1.3 SOIL - 30/5/2016 SE153116.021	TP11 1.45-1.55 SOIL - 30/5/2016 SE153116.022	TP12 0-0.15 SOIL - 30/5/2016 SE153116.023	TP13 0-0.15 SOIL - 30/5/2016 SE153116.024	TP13 0.2-0.5 SOIL - 30/5/2016 SE153116.025
% Moisture	%w/w	0.5	11	11	18	20	16

PARAMETER	UOM	LOR	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0-0.15 SOIL - 30/5/2016 SE153116.027	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116.028	TP14 1.05-1.15 SOIL - 30/5/2016 SE153116.029	TP15 0-0.15 SOIL - 30/5/2016 SE153116.030
% Moisture	%w/w	0.5	15	21	16	13	18

PARAMETER	UOM	LOR	TP16 0-0.15 SOIL - 31/5/2016 SE153116.031	TP16 0.5-0.8 SOIL - 31/5/2016 SE153116.032	TP16 1.0-1.3 SOIL - 31/5/2016 SE153116.033	TP16 1.5-1.8 SOIL - 31/5/2016 SE153116.034	TP16 2.0-2.2 SOIL - 31/5/2016 SE153116.035
% Moisture	%w/w	0.5	8.4	11	11	12	12

Moisture Content [AN002] Tested: 6/6/2016 (continued)

PARAMETER	UOM	LOR	TP16 2.25-2.35 SOIL - 31/5/2016 SE153116.036	TP17 0-0.15 SOIL - 31/5/2016 SE153116.037	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116.038	TP17 1.0-1.3 SOIL - 31/5/2016 SE153116.039	TP17 1.5-1.8 SOIL - 31/5/2016 SE153116.040
% Moisture	%w/w	0.5	13	5.9	13	11	11

PARAMETER	UOM	LOR	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP18 0-0.15 SOIL - 30/5/2016 SE153116.042	TP19 0-0.15 SOIL - 30/5/2016 SE153116.043	TP19 0.5-0.8 SOIL - 30/5/2016 SE153116.044	TP19 1.0-1.3 SOIL - 30/5/2016 SE153116.045
% Moisture	%w/w	0.5	28	38	9.6	23	19

PARAMETER	UOM	LOR	TP19 1.55-1.65 SOIL - 30/5/2016 SE153116.046	TP20 0-0.15 SOIL - 30/5/2016 SE153116.047	TP20 0.5-0.8 SOIL - 30/5/2016 SE153116.048	TP20 1.0-1.3 SOIL - 30/5/2016 SE153116.049	TP20 1.55-1.65 SOIL - 30/5/2016 SE153116.050
% Moisture	%w/w	0.5	34	13	16	19	21

PARAMETER	UOM	LOR	TP21 0-0.15 SOIL - 30/5/2016 SE153116.051	TP22 0-0.15 SOIL - 30/5/2016 SE153116.052	TP23 0-0.15 SOIL - 30/5/2016 SE153116.053	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054	TP24 0.5-0.8 SOIL - 30/5/2016 SE153116.055
% Moisture	%w/w	0.5	25	22	33	13	18

PARAMETER	UOM	LOR	TP24 1.0-1.3 SOIL - 30/5/2016 SE153116.056	TP24 1.55-1.65 SOIL - 30/5/2016 SE153116.057	TP25 0-0.15 SOIL - 30/5/2016 SE153116.058	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	TP25 1.0-1.3 SOIL - 30/5/2016 SE153116.062
% Moisture	%w/w	0.5	18	20	7.3	16	26

PARAMETER	UOM	LOR	TP25 1.5-1.8 SOIL - 30/5/2016 SE153116.064	TP25 1.85-1.5 SOIL - 30/5/2016 SE153116.065	TP26 0-0.15 SOIL - 30/5/2016 SE153116.066	TP26 0.25-0.35 SOIL - 30/5/2016 SE153116.067	TP27 0-0.15 SOIL - 30/5/2016 SE153116.068
% Moisture	%w/w	0.5	37	45	12	20	11

PARAMETER	UOM	LOR	TP27 0.35-0.45 SOIL - 30/5/2016 SE153116.069	Duplicate D1 SOIL - 30/5/2016 SE153116.072	Duplicate D2 SOIL - 30/5/2016 SE153116.073	Duplicate D3 SOIL - 30/5/2016 SE153116.074	Duplicate D4 SOIL - 30/5/2016 SE153116.075
% Moisture	%w/w	0.5	27	14	7.8	21	36

Gravimetric Determination of Asbestos in Soil [AN605] Tested: 8/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116.001	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116.002	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116.008	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116.018	TP13 0-0.15 SOIL - 30/5/2016 SE153116.024
Total Sample Weight	g	1	**465**	**637**	**533**	**550**	**500**
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Fibre Type	No unit	-	-	-	-	-	-

PARAMETER	UOM	LOR	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116.026	TP14 0-0.15 SOIL - 30/5/2016 SE153116.027	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116.041	TP24 0-0.15 SOIL - 30/5/2016 SE153116.054	TP25 0-0.15 SOIL - 30/5/2016 SE153116.058
Total Sample Weight	g	1	**663**	**610**	**543**	**724**	**796**
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	**0.136**	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	**0.022**	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	**0.022**	<0.001	<0.001	<0.001
Fibre Type	No unit	-	-	CRY	-	-	-

PARAMETER	UOM	LOR	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116.060	TP25 1.0-1.3 SOIL - 30/5/2016 SE153116.062	TP25 1.5-1.8 SOIL - 30/5/2016 SE153116.064	TP26 0-0.15 SOIL - 30/5/2016 SE153116.066	FCP1 0-0.1 SOIL - 30/5/2016 SE153116.071
Total Sample Weight	g	1	**565**	**346**	**427**	**537**	**754**
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	**0.0180**	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	**0.004**	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	**0.004**	<0.001	<0.001
Fibre Type	No unit	-	-	-	CRY	-	-

Fibre ID in bulk materials [AN602] Tested: 8/6/2016

PARAMETER	UOM	LOR	TP25 0.5-0.8 FCP MATERIAL - 30/5/2016 SE153116.059	TP25 1.0-1.3 FCP MATERIAL - 30/5/2016 SE153116.061	TP25 1.5-1.8 FCP MATERIAL - 30/5/2016 SE153116.063	FCP1 Ground Surface FCP MATERIAL - 30/5/2016 SE153116.070
Asbestos Detected	No unit	-	No	No	Yes	No

Metals in Water (Dissolved) by ICPOES [AN320/AN321] Tested: 8/6/2016

PARAMETER	UOM	LOR	Rinsate R1 WATER - 30/5/2016 SE153116.076	Rinsate R2 WATER - 31/5/2016 SE153116.077
Arsenic, As	mg/L	0.02	<0.02	<0.02
Cadmium, Cd	mg/L	0.001	<0.001	<0.001
Chromium, Cr	mg/L	0.005	<0.005	<0.005
Copper, Cu	mg/L	0.005	<0.005	<0.005
Lead, Pb	mg/L	0.02	<0.02	<0.02
Nickel, Ni	mg/L	0.005	<0.005	<0.005
Zinc, Zn	mg/L	0.01	<0.01	<0.01

Mercury (dissolved) in Water [AN311/AN312] Tested: 8/6/2016

PARAMETER	UOM	LOR	Rinsate R1 WATER - 30/5/2016 SE153116.076	Rinsate R2 WATER - 31/5/2016 SE153116.077
Mercury	mg/L	0.0001	<0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pre-treated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is refernced to Rayment and Higginson, 1992, sections 15D3 and 15N1.-
AN311/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
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434/AN410	VOCs and C6-C9/C6-C10 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.
AN433/AN434	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).
AN605	This technique gravimetrically determines the mass of Asbestos Containing Material retained on a 7mm Sieve and assumes that 15% of this ACM is asbestos. This calculated asbestos weight is then calculated as a percentage of the total sample weight.
AN605	This technique also gravimetrically determines the mass of Fibrous Asbestos (FA) and Asbestos Fines (AF) Containing Material retained on and passing a 2mm sieve post 7mm sieving. Assumes that FA and AF are 100% asbestos containing. This calculated asbestos weight is then calculated as a percentage of the total sample weight. This does not include free fibres which are only observed by standard trace analysis as per AN 602.
AN605	AMO = Amosite CRY = Chrysotile CRO = Crocidolite
AN605	Insofar as is technically feasible, this report is consistent with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009.

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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/en/terms-and-conditions. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

STATEMENT OF QA/QC PERFORMANCE

SE153116 R0

CLIENT DETAILS

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Project	**13757-2 Warriewood**
Order Number	(Not specified)
Samples	78

LABORATORY DETAILS

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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE153116 R0**
Date Received	01 Jun 2016
Date Reported	10 Jun 2016

COMMENTS

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

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

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

Duplicate	Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES	2 items
Matrix Spike	Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES	2 items

SAMPLE SUMMARY

Sample counts by matrix	72 Soil,2 Water,4 FC	Type of documentation received	COC
Date documentation received	2/6/16@12:59pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	10.2°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE153116 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.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
BH2 0-0.15	SE153116.003	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
BH4 0-0.15	SE153116.005	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
BH7 0-0.15	SE153116.010	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
BH7 0.3-0.6	SE153116.011	LB102815	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
TP9 0-0.15	SE153116.013	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP11 0-0.15	SE153116.019	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP13 0-0.15	SE153116.024	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP15 0-0.15	SE153116.030	LB102815	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP17 0-0.15	SE153116.037	LB102817	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102817	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102817	31 May 2016	01 Jun 2016	28 Jun 2016	07 Jun 2016	28 Jun 2016	10 Jun 2016
TP18 0-0.15	SE153116.042	LB102817	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP19 0-0.15	SE153116.043	LB102817	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP20 0-0.15	SE153116.047	LB102817	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP22 0-0.15	SE153116.052	LB102817	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102817	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016
TP26 0-0.15	SE153116.066	LB102817	30 May 2016	01 Jun 2016	27 Jun 2016	07 Jun 2016	27 Jun 2016	10 Jun 2016

Fibre ID in bulk materials

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP25 0.5-0.8 FCP	SE153116.059	LB102891	30 May 2016	01 Jun 2016	30 May 2017	08 Jun 2016	30 May 2017	09 Jun 2016
TP25 1.0-1.3 FCP	SE153116.061	LB102891	30 May 2016	01 Jun 2016	30 May 2017	08 Jun 2016	30 May 2017	09 Jun 2016
TP25 1.5-1.8 FCP	SE153116.063	LB102891	30 May 2016	01 Jun 2016	30 May 2017	08 Jun 2016	30 May 2017	09 Jun 2016
FCP1 Ground Surface FCP	SE153116.070	LB102891	30 May 2016	01 Jun 2016	30 May 2017	08 Jun 2016	30 May 2017	09 Jun 2016

Gravimetric Determination of Asbestos in Soil

Method: ME-(AU)-[ENV]AN605

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102895	31 May 2016	01 Jun 2016	27 Nov 2016	08 Jun 2016	27 Nov 2016	09 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102895	31 May 2016	01 Jun 2016	27 Nov 2016	08 Jun 2016	27 Nov 2016	09 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102895	31 May 2016	01 Jun 2016	27 Nov 2016	08 Jun 2016	27 Nov 2016	09 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP13 0-0.15	SE153116.024	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP14 0-0.15	SE153116.027	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102895	31 May 2016	01 Jun 2016	27 Nov 2016	08 Jun 2016	27 Nov 2016	09 Jun 2016
TP24 0-0.15	SE153116.054	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 0-0.15	SE153116.058	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 1.0-1.3	SE153116.062	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 1.5-1.8	SE153116.064	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
TP26 0-0.15	SE153116.066	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016
FCP1 0-0.1	SE153116.071	LB102895	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	09 Jun 2016

Mercury (dissolved) in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE153116.076	LB102855	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	08 Jun 2016
Rinsate R2	SE153116.077	LB102855	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	08 Jun 2016

Mercury in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
BH2 0-0.15	SE153116.003	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
BH3 0-0.15	SE153116.004	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016

HOLDING TIME SUMMARY

SE153116 R0

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

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

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

Mercury in Soil (continued) — **Method: ME-(AU)-[ENV]AN312**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH4 0-0.15	SE153116.005	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP5 0-0.15	SE153116.006	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
BH6 0-0.15	SE153116.009	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
BH7 0-0.15	SE153116.010	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
BH7 0.3-0.6	SE153116.011	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
BH8 0-0.15	SE153116.012	LB102867	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP9 0-0.15	SE153116.013	LB102867	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP10 0-0.15	SE153116.014	LB102867	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP10 0.5-0.8	SE153116.015	LB102867	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP10 1.0-1.3	SE153116.016	LB102867	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP10 1.5-1.8	SE153116.017	LB102867	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102867	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP11 0-0.15	SE153116.019	LB102867	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP11 1.0-1.3	SE153116.021	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP11 1.45-1.55	SE153116.022	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP12 0-0.15	SE153116.023	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP13 0-0.15	SE153116.024	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP14 0-0.15	SE153116.027	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP14 1.05-1.15	SE153116.029	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP15 0-0.15	SE153116.030	LB102868	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP16 0-0.15	SE153116.031	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP16 1.0-1.3	SE153116.033	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP16 1.5-1.8	SE153116.034	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP16 2.0-2.2	SE153116.035	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP16 2.25-2.35	SE153116.036	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP17 0-0.15	SE153116.037	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102868	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP17 1.0-1.3	SE153116.039	LB102869	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP17 1.5-1.8	SE153116.040	LB102869	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102869	31 May 2016	01 Jun 2016	28 Jun 2016	08 Jun 2016	28 Jun 2016	09 Jun 2016
TP18 0-0.15	SE153116.042	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP19 0-0.15	SE153116.043	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP19 1.0-1.3	SE153116.045	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP19 1.55-1.65	SE153116.046	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP20 0-0.15	SE153116.047	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP20 0.5-0.8	SE153116.048	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP20 1.0-1.3	SE153116.049	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP20 1.55-1.65	SE153116.050	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP21 0-0.15	SE153116.051	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP22 0-0.15	SE153116.052	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP23 0-0.15	SE153116.053	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP24 0-0.15	SE153116.054	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP24 0.5-0.8	SE153116.055	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP24 1.0-1.3	SE153116.056	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP24 1.55-1.65	SE153116.057	LB102869	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP25 0-0.15	SE153116.058	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP25 1.0-1.3	SE153116.062	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP25 1.5-1.8	SE153116.064	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP25 1.85-1.5	SE153116.065	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP26 0-0.15	SE153116.066	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP26 0.25-0.35	SE153116.067	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016

HOLDING TIME SUMMARY

SE153116 R0

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

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

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

Mercury in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP27 0-0.15	SE153116.068	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
TP27 0.35-0.45	SE153116.069	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
Duplicate D1	SE153116.072	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
Duplicate D2	SE153116.073	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
Duplicate D3	SE153116.074	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016
Duplicate D4	SE153116.075	LB102870	30 May 2016	01 Jun 2016	27 Jun 2016	08 Jun 2016	27 Jun 2016	09 Jun 2016

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE153116.076	LB102848	30 May 2016	01 Jun 2016	26 Nov 2016	08 Jun 2016	26 Nov 2016	08 Jun 2016
Rinsate R2	SE153116.077	LB102848	31 May 2016	01 Jun 2016	27 Nov 2016	08 Jun 2016	27 Nov 2016	08 Jun 2016

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH2 0-0.15	SE153116.003	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH3 0-0.15	SE153116.004	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH4 0-0.15	SE153116.005	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP5 0-0.15	SE153116.006	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH6 0-0.15	SE153116.009	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH7 0-0.15	SE153116.010	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH7 0.3-0.6	SE153116.011	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
BH8 0-0.15	SE153116.012	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP9 0-0.15	SE153116.013	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP10 0-0.15	SE153116.014	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP10 0.5-0.8	SE153116.015	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP10 1.0-1.3	SE153116.016	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP10 1.5-1.8	SE153116.017	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP11 0-0.15	SE153116.019	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP11 1.0-1.3	SE153116.021	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP11 1.45-1.55	SE153116.022	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP12 0-0.15	SE153116.023	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP13 0-0.15	SE153116.024	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	08 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP14 0-0.15	SE153116.027	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP14 1.05-1.15	SE153116.029	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP15 0-0.15	SE153116.030	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP16 0-0.15	SE153116.031	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP16 1.0-1.3	SE153116.033	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP16 1.5-1.8	SE153116.034	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP16 2.0-2.2	SE153116.035	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP16 2.25-2.35	SE153116.036	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP17 0-0.15	SE153116.037	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP17 1.0-1.3	SE153116.039	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP17 1.5-1.8	SE153116.040	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102668	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP18 0-0.15	SE153116.042	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP19 0-0.15	SE153116.043	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP19 1.0-1.3	SE153116.045	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP19 1.55-1.65	SE153116.046	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP20 0-0.15	SE153116.047	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016

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
TP20 0.5-0.8	SE153116.048	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP20 1.0-1.3	SE153116.049	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP20 1.55-1.65	SE153116.050	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP21 0-0.15	SE153116.051	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP22 0-0.15	SE153116.052	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP23 0-0.15	SE153116.053	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP24 0-0.15	SE153116.054	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP24 0.5-0.8	SE153116.055	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP24 1.0-1.3	SE153116.056	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP24 1.55-1.65	SE153116.057	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP25 0-0.15	SE153116.058	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP25 1.0-1.3	SE153116.062	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP25 1.5-1.8	SE153116.064	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP25 1.85-1.5	SE153116.065	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP26 0-0.15	SE153116.066	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP26 0.25-0.35	SE153116.067	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP27 0-0.15	SE153116.068	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
TP27 0.35-0.45	SE153116.069	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
Duplicate D1	SE153116.072	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
Duplicate D2	SE153116.073	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
Duplicate D3	SE153116.074	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016
Duplicate D4	SE153116.075	LB102668	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	11 Jun 2016	09 Jun 2016

OC Pesticides in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH2 0-0.15	SE153116.003	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH3 0-0.15	SE153116.004	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH4 0-0.15	SE153116.005	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 0-0.15	SE153116.006	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH6 0-0.15	SE153116.009	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH7 0-0.15	SE153116.010	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH8 0-0.15	SE153116.012	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP9 0-0.15	SE153116.013	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP10 0-0.15	SE153116.014	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP11 0-0.15	SE153116.019	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP12 0-0.15	SE153116.023	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0-0.15	SE153116.024	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP14 0-0.15	SE153116.027	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP15 0-0.15	SE153116.030	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0-0.15	SE153116.031	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 0-0.15	SE153116.037	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP18 0-0.15	SE153116.042	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0-0.15	SE153116.043	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP20 0-0.15	SE153116.047	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP21 0-0.15	SE153116.051	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP22 0-0.15	SE153116.052	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016

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]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP23 0-0.15	SE153116.053	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP24 0-0.15	SE153116.054	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP25 0-0.15	SE153116.058	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP26 0-0.15	SE153116.066	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP27 0-0.15	SE153116.068	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
Duplicate D1	SE153116.072	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
Duplicate D2	SE153116.073	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016

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
BH1 0-0.1	SE153116.001	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH2 0-0.15	SE153116.003	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH3 0-0.15	SE153116.004	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH4 0-0.15	SE153116.005	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 0-0.15	SE153116.006	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH6 0-0.15	SE153116.009	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH7 0-0.15	SE153116.010	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH8 0-0.15	SE153116.012	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP9 0-0.15	SE153116.013	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP10 0-0.15	SE153116.014	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP11 0-0.15	SE153116.019	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP12 0-0.15	SE153116.023	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0-0.15	SE153116.024	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP14 0-0.15	SE153116.027	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP15 0-0.15	SE153116.030	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0-0.15	SE153116.031	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 0-0.15	SE153116.037	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP18 0-0.15	SE153116.042	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0-0.15	SE153116.043	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP20 0-0.15	SE153116.047	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP21 0-0.15	SE153116.051	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP22 0-0.15	SE153116.052	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP23 0-0.15	SE153116.053	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP24 0-0.15	SE153116.054	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP25 0-0.15	SE153116.058	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP26 0-0.15	SE153116.066	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP27 0-0.15	SE153116.068	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
Duplicate D1	SE153116.072	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
Duplicate D2	SE153116.073	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016

PCBs in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH2 0-0.15	SE153116.003	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH3 0-0.15	SE153116.004	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH4 0-0.15	SE153116.005	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016

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.

PCBs in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP5 0-0.15	SE153116.006	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH6 0-0.15	SE153116.009	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH7 0-0.15	SE153116.010	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH8 0-0.15	SE153116.012	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP9 0-0.15	SE153116.013	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP10 0-0.15	SE153116.014	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP11 0-0.15	SE153116.019	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP12 0-0.15	SE153116.023	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0-0.15	SE153116.024	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP14 0-0.15	SE153116.027	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP15 0-0.15	SE153116.030	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0-0.15	SE153116.031	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 0-0.15	SE153116.037	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP18 0-0.15	SE153116.042	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0-0.15	SE153116.043	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP20 0-0.15	SE153116.047	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP21 0-0.15	SE153116.051	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP22 0-0.15	SE153116.052	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP23 0-0.15	SE153116.053	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP24 0-0.15	SE153116.054	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP25 0-0.15	SE153116.058	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP26 0-0.15	SE153116.066	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP27 0-0.15	SE153116.068	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
Duplicate D1	SE153116.072	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
Duplicate D2	SE153116.073	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016

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

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102807	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102807	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH2 0-0.15	SE153116.003	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH3 0-0.15	SE153116.004	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH4 0-0.15	SE153116.005	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP5 0-0.15	SE153116.006	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH6 0-0.15	SE153116.009	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH7 0-0.15	SE153116.010	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH7 0.3-0.6	SE153116.011	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
BH8 0-0.15	SE153116.012	LB102808	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP9 0-0.15	SE153116.013	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP10 0-0.15	SE153116.014	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP10 0.5-0.8	SE153116.015	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP10 1.0-1.3	SE153116.016	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP10 1.5-1.8	SE153116.017	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP11 0-0.15	SE153116.019	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016

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 Metals 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
TP11 1.0-1.3	SE153116.021	LB102808	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP11 1.45-1.55	SE153116.022	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP12 0-0.15	SE153116.023	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP13 0-0.15	SE153116.024	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP14 0-0.15	SE153116.027	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP14 1.05-1.15	SE153116.029	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP15 0-0.15	SE153116.030	LB102809	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP16 0-0.15	SE153116.031	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP16 1.0-1.3	SE153116.033	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP16 1.5-1.8	SE153116.034	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP16 2.0-2.2	SE153116.035	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP16 2.25-2.35	SE153116.036	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP17 0-0.15	SE153116.037	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP17 1.0-1.3	SE153116.039	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP17 1.5-1.8	SE153116.040	LB102809	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102810	31 May 2016	01 Jun 2016	27 Nov 2016	07 Jun 2016	27 Nov 2016	09 Jun 2016
TP18 0-0.15	SE153116.042	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP19 0-0.15	SE153116.043	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP19 1.0-1.3	SE153116.045	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP19 1.55-1.65	SE153116.046	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP20 0-0.15	SE153116.047	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP20 0.5-0.8	SE153116.048	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP20 1.0-1.3	SE153116.049	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP20 1.55-1.65	SE153116.050	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP21 0-0.15	SE153116.051	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP22 0-0.15	SE153116.052	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP23 0-0.15	SE153116.053	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP24 0-0.15	SE153116.054	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP24 0.5-0.8	SE153116.055	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP24 1.0-1.3	SE153116.056	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP24 1.55-1.65	SE153116.057	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 0-0.15	SE153116.058	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102810	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 1.0-1.3	SE153116.062	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 1.5-1.8	SE153116.064	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP25 1.85-1.5	SE153116.065	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP26 0-0.15	SE153116.066	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP26 0.25-0.35	SE153116.067	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP27 0-0.15	SE153116.068	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
TP27 0.35-0.45	SE153116.069	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
Duplicate D1	SE153116.072	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
Duplicate D2	SE153116.073	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
Duplicate D3	SE153116.074	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016
Duplicate D4	SE153116.075	LB102812	30 May 2016	01 Jun 2016	26 Nov 2016	07 Jun 2016	26 Nov 2016	09 Jun 2016

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116.001	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH1 0.15-0.25	SE153116.002	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
BH2 0-0.15	SE153116.003	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH3 0-0.15	SE153116.004	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH4 0-0.15	SE153116.005	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 0-0.15	SE153116.006	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016

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.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP5 1.05-1.15	SE153116.008	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
BH6 0-0.15	SE153116.009	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH7 0-0.15	SE153116.010	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
BH8 0-0.15	SE153116.012	LB102721	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP9 0-0.15	SE153116.013	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP10 0-0.15	SE153116.014	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP11 0-0.15	SE153116.019	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP12 0-0.15	SE153116.023	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0-0.15	SE153116.024	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102721	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP14 0-0.15	SE153116.027	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP15 0-0.15	SE153116.030	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0-0.15	SE153116.031	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP17 0-0.15	SE153116.037	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102722	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP18 0-0.15	SE153116.042	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0-0.15	SE153116.043	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP20 0-0.15	SE153116.047	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP21 0-0.15	SE153116.051	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP22 0-0.15	SE153116.052	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP23 0-0.15	SE153116.053	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP24 0-0.15	SE153116.054	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP25 0-0.15	SE153116.058	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP26 0-0.15	SE153116.066	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
TP27 0-0.15	SE153116.068	LB102722	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016
Duplicate D1	SE153116.072	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
Duplicate D2	SE153116.073	LB102723	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	10 Jun 2016

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.15-0.25	SE153116.002	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP5 1.05-1.15	SE153116.008	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP10 0-0.15	SE153116.014	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102733	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102733	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP20 0-0.15	SE153116.047	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP24 0-0.15	SE153116.054	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
Duplicate D1	SE153116.072	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
Tripspike TS1	SE153116.078	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0.15-0.25	SE153116.002	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP5 0.5-0.8	SE153116.007	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016

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/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP5 1.05-1.15	SE153116.008	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP10 0-0.15	SE153116.014	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP10 1.85-1.95	SE153116.018	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP11 0.5-0.8	SE153116.020	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP13 0.2-0.5	SE153116.025	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP13 0.55-0.65	SE153116.026	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP14 0.5-0.8	SE153116.028	LB102730	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP16 0.5-0.8	SE153116.032	LB102730	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP17 0.5-0.8	SE153116.038	LB102733	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP17 2.05-2.15	SE153116.041	LB102733	31 May 2016	01 Jun 2016	14 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP19 0.5-0.8	SE153116.044	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP20 0-0.15	SE153116.047	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP24 0-0.15	SE153116.054	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
TP25 0.5-0.8	SE153116.060	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
Duplicate D1	SE153116.072	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016
Tripspike TS1	SE153116.078	LB102733	30 May 2016	01 Jun 2016	13 Jun 2016	06 Jun 2016	16 Jul 2016	09 Jun 2016

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

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

OC Pesticides in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1 0-0.1	SE153116.001	%	60 - 130%	95
	BH1 0.15-0.25	SE153116.002	%	60 - 130%	104
	BH2 0-0.15	SE153116.003	%	60 - 130%	101
	BH3 0-0.15	SE153116.004	%	60 - 130%	108
	BH4 0-0.15	SE153116.005	%	60 - 130%	99
	TP5 0-0.15	SE153116.006	%	60 - 130%	98
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	100
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	96
	BH6 0-0.15	SE153116.009	%	60 - 130%	99
	BH7 0-0.15	SE153116.010	%	60 - 130%	99
	BH8 0-0.15	SE153116.012	%	60 - 130%	103
	TP9 0-0.15	SE153116.013	%	60 - 130%	100
	TP10 0-0.15	SE153116.014	%	60 - 130%	99
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	101
	TP11 0-0.15	SE153116.019	%	60 - 130%	99
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	99
	TP12 0-0.15	SE153116.023	%	60 - 130%	102
	TP13 0-0.15	SE153116.024	%	60 - 130%	102
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	100
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	104
	TP14 0-0.15	SE153116.027	%	60 - 130%	103
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	101
	TP15 0-0.15	SE153116.030	%	60 - 130%	103
	TP16 0-0.15	SE153116.031	%	60 - 130%	98
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	97
	TP17 0-0.15	SE153116.037	%	60 - 130%	97
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	101
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	100
	TP18 0-0.15	SE153116.042	%	60 - 130%	108
	TP19 0-0.15	SE153116.043	%	60 - 130%	101
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	99
	TP20 0-0.15	SE153116.047	%	60 - 130%	115
	TP21 0-0.15	SE153116.051	%	60 - 130%	107
	TP22 0-0.15	SE153116.052	%	60 - 130%	108
	TP23 0-0.15	SE153116.053	%	60 - 130%	111
	TP24 0-0.15	SE153116.054	%	60 - 130%	103
	TP25 0-0.15	SE153116.058	%	60 - 130%	99
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	112
	TP26 0-0.15	SE153116.066	%	60 - 130%	105
	TP27 0-0.15	SE153116.068	%	60 - 130%	99
	Duplicate D1	SE153116.072	%	60 - 130%	108
	Duplicate D2	SE153116.073	%	60 - 130%	105

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1 0.15-0.25	SE153116.002	%	70 - 130%	84
	TP5 0.5-0.8	SE153116.007	%	70 - 130%	88
	TP5 1.05-1.15	SE153116.008	%	70 - 130%	88
	TP10 0-0.15	SE153116.014	%	70 - 130%	84
	TP10 1.85-1.95	SE153116.018	%	70 - 130%	88
	TP11 0.5-0.8	SE153116.020	%	70 - 130%	86
	TP13 0.2-0.5	SE153116.025	%	70 - 130%	84
	TP13 0.55-0.65	SE153116.026	%	70 - 130%	82
	TP14 0.5-0.8	SE153116.028	%	70 - 130%	82
	TP16 0.5-0.8	SE153116.032	%	70 - 130%	82
	TP17 0.5-0.8	SE153116.038	%	70 - 130%	78
	TP17 2.05-2.15	SE153116.041	%	70 - 130%	84
	TP19 0.5-0.8	SE153116.044	%	70 - 130%	84
	TP20 0-0.15	SE153116.047	%	70 - 130%	94
	TP24 0-0.15	SE153116.054	%	70 - 130%	86
	TP25 0.5-0.8	SE153116.060	%	70 - 130%	74

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 %
2-fluorobiphenyl (Surrogate)	Duplicate D1	SE153116.072	%	70 - 130%	76
d14-p-terphenyl (Surrogate)	BH1 0.15-0.25	SE153116.002	%	70 - 130%	80
	TP5 0.5-0.8	SE153116.007	%	70 - 130%	108
	TP5 1.05-1.15	SE153116.008	%	70 - 130%	114
	TP10 0-0.15	SE153116.014	%	70 - 130%	94
	TP10 1.85-1.95	SE153116.018	%	70 - 130%	112
	TP11 0.5-0.8	SE153116.020	%	70 - 130%	114
	TP13 0.2-0.5	SE153116.025	%	70 - 130%	118
	TP13 0.55-0.65	SE153116.026	%	70 - 130%	100
	TP14 0.5-0.8	SE153116.028	%	70 - 130%	118
	TP16 0.5-0.8	SE153116.032	%	70 - 130%	118
	TP17 0.5-0.8	SE153116.038	%	70 - 130%	116
	TP17 2.05-2.15	SE153116.041	%	70 - 130%	114
	TP19 0.5-0.8	SE153116.044	%	70 - 130%	104
	TP20 0-0.15	SE153116.047	%	70 - 130%	102
	TP24 0-0.15	SE153116.054	%	70 - 130%	108
	TP25 0.5-0.8	SE153116.060	%	70 - 130%	110
	Duplicate D1	SE153116.072	%	70 - 130%	104
d5-nitrobenzene (Surrogate)	BH1 0.15-0.25	SE153116.002	%	70 - 130%	84
	TP5 0.5-0.8	SE153116.007	%	70 - 130%	96
	TP5 1.05-1.15	SE153116.008	%	70 - 130%	88
	TP10 0-0.15	SE153116.014	%	70 - 130%	86
	TP10 1.85-1.95	SE153116.018	%	70 - 130%	90
	TP11 0.5-0.8	SE153116.020	%	70 - 130%	92
	TP13 0.2-0.5	SE153116.025	%	70 - 130%	92
	TP13 0.55-0.65	SE153116.026	%	70 - 130%	84
	TP14 0.5-0.8	SE153116.028	%	70 - 130%	94
	TP16 0.5-0.8	SE153116.032	%	70 - 130%	92
	TP17 0.5-0.8	SE153116.038	%	70 - 130%	84
	TP17 2.05-2.15	SE153116.041	%	70 - 130%	94
	TP19 0.5-0.8	SE153116.044	%	70 - 130%	96
	TP20 0-0.15	SE153116.047	%	70 - 130%	98
	TP24 0-0.15	SE153116.054	%	70 - 130%	96
	TP25 0.5-0.8	SE153116.060	%	70 - 130%	78
	Duplicate D1	SE153116.072	%	70 - 130%	82

PCBs in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	104
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	100
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	96
	TP10 0-0.15	SE153116.014	%	60 - 130%	99
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	101
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	99
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	100
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	104
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	101
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	97
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	101
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	100
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	99
	TP20 0-0.15	SE153116.047	%	60 - 130%	115
	TP24 0-0.15	SE153116.054	%	60 - 130%	103
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	112
	Duplicate D1	SE153116.072	%	60 - 130%	108

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	81
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	75
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	74
	TP10 0-0.15	SE153116.014	%	60 - 130%	80

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/AN434**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TP10 1.85-1.95	SE153116.018	%	60 - 130%	76
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	77
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	78
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	76
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	79
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	76
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	101
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	99
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	87
	TP20 0-0.15	SE153116.047	%	60 - 130%	112
	TP24 0-0.15	SE153116.054	%	60 - 130%	96
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	96
	Duplicate D1	SE153116.072	%	60 - 130%	97
	Tripspike TS1	SE153116.078	%	60 - 130%	123
d4-1,2-dichloroethane (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	79
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	72
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	70
	TP10 0-0.15	SE153116.014	%	60 - 130%	78
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	76
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	79
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	87
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	84
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	78
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	71
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	110
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	113
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	116
	TP20 0-0.15	SE153116.047	%	60 - 130%	126
	TP24 0-0.15	SE153116.054	%	60 - 130%	129
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	103
	Duplicate D1	SE153116.072	%	60 - 130%	106
	Tripspike TS1	SE153116.078	%	60 - 130%	96
d8-toluene (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	79
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	74
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	71
	TP10 0-0.15	SE153116.014	%	60 - 130%	77
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	71
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	75
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	73
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	74
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	77
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	73
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	77
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	79
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	92
	TP20 0-0.15	SE153116.047	%	60 - 130%	116
	TP24 0-0.15	SE153116.054	%	60 - 130%	91
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	104
	Duplicate D1	SE153116.072	%	60 - 130%	118
	Tripspike TS1	SE153116.078	%	60 - 130%	80
Dibromofluoromethane (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	82
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	75
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	74
	TP10 0-0.15	SE153116.014	%	60 - 130%	82
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	80
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	83
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	94
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	87
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	79
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	73
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	98

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/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Dibromofluoromethane (Surrogate)	TP17 2.05-2.15	SE153116.041	%	60 - 130%	99
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	124
	TP20 0-0.15	SE153116.047	%	60 - 130%	109
	TP24 0-0.15	SE153116.054	%	60 - 130%	127
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	113
	Duplicate D1	SE153116.072	%	60 - 130%	112
	Tripspike TS1	SE153116.078	%	60 - 130%	90

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	81
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	75
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	74
	TP10 0-0.15	SE153116.014	%	60 - 130%	80
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	76
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	77
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	78
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	76
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	79
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	76
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	101
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	99
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	87
	TP20 0-0.15	SE153116.047	%	60 - 130%	112
	TP24 0-0.15	SE153116.054	%	60 - 130%	96
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	96
	Duplicate D1	SE153116.072	%	60 - 130%	97
d4-1,2-dichloroethane (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	79
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	72
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	70
	TP10 0-0.15	SE153116.014	%	60 - 130%	78
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	76
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	79
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	87
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	84
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	78
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	71
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	110
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	113
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	116
	TP20 0-0.15	SE153116.047	%	60 - 130%	126
	TP24 0-0.15	SE153116.054	%	60 - 130%	129
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	103
	Duplicate D1	SE153116.072	%	60 - 130%	106
d8-toluene (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	79
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	74
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	71
	TP10 0-0.15	SE153116.014	%	60 - 130%	77
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	71
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	75
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	73
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	74
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	77
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	73
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	77
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	79
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	92
	TP20 0-0.15	SE153116.047	%	60 - 130%	116
	TP24 0-0.15	SE153116.054	%	60 - 130%	91
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	104
	Duplicate D1	SE153116.072	%	60 - 130%	118

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/AN434/AN410**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Dibromofluoromethane (Surrogate)	BH1 0.15-0.25	SE153116.002	%	60 - 130%	82
	TP5 0.5-0.8	SE153116.007	%	60 - 130%	75
	TP5 1.05-1.15	SE153116.008	%	60 - 130%	74
	TP10 0-0.15	SE153116.014	%	60 - 130%	82
	TP10 1.85-1.95	SE153116.018	%	60 - 130%	80
	TP11 0.5-0.8	SE153116.020	%	60 - 130%	83
	TP13 0.2-0.5	SE153116.025	%	60 - 130%	94
	TP13 0.55-0.65	SE153116.026	%	60 - 130%	87
	TP14 0.5-0.8	SE153116.028	%	60 - 130%	79
	TP16 0.5-0.8	SE153116.032	%	60 - 130%	73
	TP17 0.5-0.8	SE153116.038	%	60 - 130%	98
	TP17 2.05-2.15	SE153116.041	%	60 - 130%	99
	TP19 0.5-0.8	SE153116.044	%	60 - 130%	124
	TP20 0-0.15	SE153116.047	%	60 - 130%	109
	TP24 0-0.15	SE153116.054	%	60 - 130%	127
	TP25 0.5-0.8	SE153116.060	%	60 - 130%	113
	Duplicate D1	SE153116.072	%	60 - 130%	112

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.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR

Mercury (dissolved) in Water

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

Sample Number	Parameter	Units	LOR	Result
LB102855.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB102867.001	Mercury	mg/kg	0.01	<0.01
LB102868.001	Mercury	mg/kg	0.01	<0.01
LB102869.001	Mercury	mg/kg	0.01	<0.01
LB102870.001	Mercury	mg/kg	0.01	<0.01

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Number	Parameter	Units	LOR	Result
LB102848.001	Arsenic, As	mg/L	0.02	<0.02
	Cadmium, Cd	mg/L	0.001	<0.001
	Chromium, Cr	mg/L	0.005	<0.005
	Copper, Cu	mg/L	0.005	<0.005
	Lead, Pb	mg/L	0.02	<0.02
	Nickel, Ni	mg/L	0.005	<0.005
	Zinc, Zn	mg/L	0.01	<0.01

OC Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB102721.001		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	0.05	<0.05
		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)	%	-	95
LB102722.001		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

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

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

OC Pesticides in Soil (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB102722.001		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.05	<0.05
		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)	%	-	101
LB102723.001		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	0.05	<0.05
		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)	%	-	103

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB102721.001		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)	%	-	82
		2-fluorobiphenyl (Surrogate)	%	-	80
		d14-p-terphenyl (Surrogate)	%	-	74

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
LB102722.001		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)	%	-	82
		2-fluorobiphenyl (Surrogate)	%	-	80
		d14-p-terphenyl (Surrogate)	%	-	74
LB102723.001		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)	%	-	86
		2-fluorobiphenyl (Surrogate)	%	-	80
		d14-p-terphenyl (Surrogate)	%	-	104

PCBs in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB102721.001		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)	%	-	95
LB102722.001		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

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.

PCBs in Soil (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB102722.001		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)	%	-	101
LB102723.001		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)	%	-	103

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

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

Sample Number	Parameter	Units	LOR	Result
LB102807.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5
LB102808.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5
LB102809.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5
LB102810.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5
LB102812.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB102721.001	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
LB102722.001	TRH C10-C14	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.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

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

Sample Number	Parameter	Units	LOR	Result
LB102722.001	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
LB102723.001	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

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB102730.001	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)	%	-	117
		d4-1,2-dichloroethane (Surrogate)	%	-	108
		d8-toluene (Surrogate)	%	-	90
		Bromofluorobenzene (Surrogate)	%	-	85
	Totals	Total BTEX	mg/kg	0.6	<0.6
LB102733.001	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)	%	-	83
		d4-1,2-dichloroethane (Surrogate)	%	-	83
		d8-toluene (Surrogate)	%	-	83
		Bromofluorobenzene (Surrogate)	%	-	106
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result
LB102730.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	117
		d4-1,2-dichloroethane (Surrogate)	%	-	108
		d8-toluene (Surrogate)	%	-	90
LB102733.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	83
		d4-1,2-dichloroethane (Surrogate)	%	-	83
		d8-toluene (Surrogate)	%	-	83

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/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153099.004	LB102855.014	Mercury	µg/L	0.0001	-0.0068	0.005	200	196
SE153120.002	LB102855.024	Mercury	µg/L	0.0001	0	-0.0044	200	0

Mercury in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.010	LB102867.014	Mercury	mg/kg	0.01	0.07	0.06	111	11
SE153116.019	LB102867.024	Mercury	mg/kg	0.01	0.05	0.04	145	0
SE153116.029	LB102868.014	Mercury	mg/kg	0.01	0.05	0.04	133	6
SE153116.038	LB102868.024	Mercury	mg/kg	0.01	0.01	0.01	200	0
SE153116.048	LB102869.014	Mercury	mg/kg	0.01	0.02	0.02	200	0
SE153116.057	LB102869.024	Mercury	mg/kg	0.01	0.05	0.05	134	0
SE153116.072	LB102870.014	Mercury	mg/kg	0.01	0.09	0.13	75	32
SE153117.038	LB102870.024	Mercury	mg/kg	0.01	0.0053635235	0.0068022240	200	0

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153100.004	LB102848.014	Chromium, Cr	mg/L	0.005	-0.00437486	-0.00414898	132	0
SE153117.045	LB102848.024	Arsenic, As	mg/L	0.02	0.00587481	0.0109448	200	0
		Cadmium, Cd	mg/L	0.001	-0.000449455	-0.000196937	200	0
		Chromium, Cr	mg/L	0.005	-0.00419668	-0.00409391	136	0
		Copper, Cu	mg/L	0.005	-0.00186886	-0.00238665	200	0
		Lead, Pb	mg/L	0.02	-0.000408636	-0.00247377	200	0
		Nickel, Ni	mg/L	0.005	-0.00139238	-0.00255716	200	0
		Zinc, Zn	mg/L	0.01	-0.00125382	-0.00129922	200	0

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.010	LB102668.011	% Moisture	%w/w	0.5	15	14	37	5
SE153116.020	LB102668.022	% Moisture	%w/w	0.5	11	11	39	1
SE153116.030	LB102668.033	% Moisture	%w/w	0.5	18	19	35	1
SE153116.040	LB102668.044	% Moisture	%w/w	0.5	11	12	39	5
SE153116.050	LB102668.055	% Moisture	%w/w	0.5	21	22	35	6
SE153116.062	LB102668.066	% Moisture	%w/w	0.5	26	24	34	8
SE153116.075	LB102668.077	% Moisture	%w/w	0.5	36	33	33	7

OC Pesticides in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.010	LB102721.014	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	0.05	<0.05	<0.05	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

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]AN400/AN420**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.010	LB102721.014		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
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	30	4
SE153116.026	LB102721.025		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	0.05	<0.05	<0.05	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
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	0.15	30	5
SE153116.043	LB102722.014		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	0.05	<0.05	<0.05	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
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	30	2
SE153116.068	LB102722.025		Hexachlorobenzene (HCB)	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.

OC Pesticides in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.068	LB102722.025		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	0.05	<0.05	<0.05	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
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	30	1

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153091.007	LB102723.027		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	0	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	0	200	0
			Anthracene	mg/kg	0.1	0	0	200	0
			Fluoranthene	mg/kg	0.1	0	0	200	0
			Pyrene	mg/kg	0.1	0	0	200	0
			Benzo(a)anthracene	mg/kg	0.1	0.01	0	200	0
			Chrysene	mg/kg	0.1	0	0	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	0	0	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	0	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	0	0.01	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0	0	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	0	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	0	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	0.242	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (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	-	0.38	0.4	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.37	0.39	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.48	0.48	30	0
SE153091.015	LB102723.025		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	0	200	0
			Acenaphthene	mg/kg	0.1	0	0	200	0
			Fluorene	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.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153091.015	LB102723.025		Phenanthrene	mg/kg	0.1	0	0	200	0
			Anthracene	mg/kg	0.1	0	0	200	0
			Fluoranthene	mg/kg	0.1	0	0	200	0
			Pyrene	mg/kg	0.1	0	0	200	0
			Benzo(a)anthracene	mg/kg	0.1	0.01	0.02	200	0
			Chrysene	mg/kg	0.1	0.01	0.01	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	0	0	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	0	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	0	0	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0	0	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	0	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	0	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	0.242	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (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	-	0.38	0.42	30	10
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.37	0.39	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.45	0.5	30	11
SE153116.026	LB102721.025		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	197	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	148	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	184	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	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	TEQ (mg/kg)	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (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	-	0.4	0.5	30	13
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2

PCBs in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.026	LB102721.025		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	5

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

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

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.

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES (continued) — **Method: ME-(AU)-[ENV]AN040/AN320**

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153115.024	LB102807.014	Arsenic, As	mg/kg	3	6	9	43	37
		Cadmium, Cd	mg/kg	0.3	<0.3	0.3	123	15
		Chromium, Cr	mg/kg	0.3	9.8	11	35	15
		Copper, Cu	mg/kg	0.5	20	19	33	4
		Lead, Pb	mg/kg	1	17	18	36	6
		Nickel, Ni	mg/kg	0.5	7.8	11	35	35 ②
		Zinc, Zn	mg/kg	0.5	27	28	37	6
SE153116.002	LB102807.024	Arsenic, As	mg/kg	3	3	4	58	13
		Cadmium, Cd	mg/kg	0.3	0.3	0.3	129	1
		Chromium, Cr	mg/kg	0.3	17	24	32	34 ②
		Copper, Cu	mg/kg	0.5	18	18	33	1
		Lead, Pb	mg/kg	1	25	31	34	21
		Nickel, Ni	mg/kg	0.5	17	18	33	7
		Zinc, Zn	mg/kg	0.5	53	58	34	10
SE153116.012	LB102808.014	Arsenic, As	mg/kg	3	6	5	48	5
		Cadmium, Cd	mg/kg	0.3	0.4	0.4	107	5
		Chromium, Cr	mg/kg	0.3	20	20	33	2
		Copper, Cu	mg/kg	0.5	15	15	33	0
		Lead, Pb	mg/kg	1	55	53	32	4
		Nickel, Ni	mg/kg	0.5	2.4	2.0	53	16
		Zinc, Zn	mg/kg	0.5	63	62	33	1
SE153116.021	LB102808.024	Arsenic, As	mg/kg	3	<3	<3	66	16
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	8.0	7.9	36	1
		Copper, Cu	mg/kg	0.5	7.5	8.6	36	14
		Lead, Pb	mg/kg	1	20	21	35	6
		Nickel, Ni	mg/kg	0.5	2.2	3.1	49	35
		Zinc, Zn	mg/kg	0.5	34	36	36	4
SE153116.031	LB102809.014	Arsenic, As	mg/kg	3	4	4	55	10
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	159	0
		Chromium, Cr	mg/kg	0.3	8.5	8.0	36	5
		Copper, Cu	mg/kg	0.5	8.1	8.3	36	3
		Lead, Pb	mg/kg	1	27	29	34	7
		Nickel, Ni	mg/kg	0.5	2.2	2.5	51	11
		Zinc, Zn	mg/kg	0.5	67	75	33	11
SE153116.040	LB102809.024	Arsenic, As	mg/kg	3	<3	<3	68	8
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	8.0	7.2	37	10
		Copper, Cu	mg/kg	0.5	6.9	5.8	38	17
		Lead, Pb	mg/kg	1	19	17	36	12
		Nickel, Ni	mg/kg	0.5	2.6	1.6	54	44
		Zinc, Zn	mg/kg	0.5	30	25	37	16
SE153116.050	LB102810.014	Arsenic, As	mg/kg	3	8	8	42	6
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	154	0
		Chromium, Cr	mg/kg	0.3	7.5	8.2	36	9
		Copper, Cu	mg/kg	0.5	17	17	33	0
		Lead, Pb	mg/kg	1	26	28	34	5
		Nickel, Ni	mg/kg	0.5	1.8	2.0	56	10
		Zinc, Zn	mg/kg	0.5	64	64	33	0
SE153116.060	LB102810.024	Arsenic, As	mg/kg	3	14	12	38	13
		Cadmium, Cd	mg/kg	0.3	3.5	3.1	39	10
		Chromium, Cr	mg/kg	0.3	22	18	32	17
		Copper, Cu	mg/kg	0.5	15	13	34	15
		Lead, Pb	mg/kg	1	59	50	32	16
		Nickel, Ni	mg/kg	0.5	3.8	2.6	46	37
		Zinc, Zn	mg/kg	0.5	45	40	35	10
SE153116.074	LB102812.014	Arsenic, As	mg/kg	3	4	4	54	12
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	191	0
		Chromium, Cr	mg/kg	0.3	19	16	33	17
		Copper, Cu	mg/kg	0.5	2.6	2.8	49	6
		Lead, Pb	mg/kg	1	19	17	36	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 Metals in Soil/Waste Solids/Materials by ICPOES (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.074	LB102812.014		Nickel, Ni	mg/kg	0.5	1.2	1.1	74	10
			Zinc, Zn	mg/kg	0.5	12	11	48	11
SE153121.002	LB102812.023		Cadmium, Cd	mg/kg	0.3	0.3	0.3	143	0

TRH (Total Recoverable Hydrocarbons) in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.026	LB102721.025		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	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153054.008	LB102730.026	Monocyclic	Benzene	mg/kg	0.1	<0.1	0	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	0	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	0	200	0
			m/p-xylene	mg/kg	0.2	<0.2	0	200	0
			o-xylene	mg/kg	0.1	<0.1	0	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0.04	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	3.69	50	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	3.66	50	12
			d8-toluene (Surrogate)	mg/kg	-	3.8	3.8	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.2	3.78	50	10
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	0	200	0
			Total BTEX	mg/kg	0.6	<0.6	0	200	0
SE153115.025	LB102733.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	4.2	50	2
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	4.5	50	1
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.6	50	0
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.5	5.8	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
SE153116.032	LB102730.025	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	-	3.7	3.9	50	7
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.5	3.8	50	6
			d8-toluene (Surrogate)	mg/kg	-	3.6	3.6	50	0
			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
SE153116.072	LB102733.026	Monocyclic	Benzene	mg/kg	0.1	<0.1	0.01	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	0	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	0.01	200	0
			m/p-xylene	mg/kg	0.2	<0.2	0.09	200	0
			o-xylene	mg/kg	0.1	<0.1	0.01	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.6	5	50	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.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116.072	LB102733.026	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	5.4	50	2
			d8-toluene (Surrogate)	mg/kg	-	5.9	4.41	50	29
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	4.2	50	15
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	0.1	200	0
			Total BTEX	mg/kg	0.6	<0.6	0.12	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153054.008	LB102730.026		TRH C6-C10	mg/kg	25	<25	0	200	0
			TRH C6-C9	mg/kg	20	<20	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	3.69	30	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	3.66	30	12
			d8-toluene (Surrogate)	mg/kg	-	3.8	3.8	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.2	3.78	30	10
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	0	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	0	200	0
SE153115.025	LB102733.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	4.2	30	2
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	4.5	30	1
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.6	30	0
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.5	5.8	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
SE153116.032	LB102730.025		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	-	3.7	3.9	30	7
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.5	3.8	30	6
			d8-toluene (Surrogate)	mg/kg	-	3.6	3.6	30	0
			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
SE153116.072	LB102733.026		TRH C6-C10	mg/kg	25	<25	0	200	0
			TRH C6-C9	mg/kg	20	<20	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.6	5	30	11
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	5.4	30	2
			d8-toluene (Surrogate)	mg/kg	-	5.9	4.41	30	29
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	4.2	30	15
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	0.01	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	-0.93	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.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102815.002	Exchangeable Sodium, Na	mg/kg	2	NA	390	80 - 120	87
	Exchangeable Potassium, K	mg/kg	2	NA	343	80 - 120	86
	Exchangeable Calcium, Ca	mg/kg	2	NA	2570	80 - 120	90
	Exchangeable Magnesium, Mg	mg/kg	2	NA	635	80 - 120	85
LB102817.002	Exchangeable Sodium, Na	mg/kg	2	NA	390	80 - 120	88
	Exchangeable Potassium, K	mg/kg	2	NA	343	80 - 120	88
	Exchangeable Calcium, Ca	mg/kg	2	NA	2570	80 - 120	88
	Exchangeable Magnesium, Mg	mg/kg	2	NA	635	80 - 120	86

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102867.002	Mercury	mg/kg	0.01	0.24	0.2	70 - 130	118
LB102868.002	Mercury	mg/kg	0.01	0.23	0.2	70 - 130	114
LB102869.002	Mercury	mg/kg	0.01	0.23	0.2	70 - 130	116
LB102870.002	Mercury	mg/kg	0.01	0.23	0.2	70 - 130	113

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102848.002	Arsenic, As	mg/L	0.02	2.1	2	80 - 120	105
	Cadmium, Cd	mg/L	0.001	2.0	2	80 - 120	102
	Chromium, Cr	mg/L	0.005	2.0	2	80 - 120	100
	Copper, Cu	mg/L	0.005	2.1	2	80 - 120	104
	Lead, Pb	mg/L	0.02	2.0	2	80 - 120	102
	Nickel, Ni	mg/L	0.005	2.0	2	80 - 120	102
	Zinc, Zn	mg/L	0.01	2.1	2	80 - 120	103

OC Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102721.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	90
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	90
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	85
		Dieldrin	mg/kg	0.05	0.16	0.2	60 - 140	80
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	95
		p,p'-DDT	mg/kg	0.1	0.1	0.2	60 - 140	70
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	40 - 130	99
LB102722.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	90
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	85
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	80
		Dieldrin	mg/kg	0.05	0.17	0.2	60 - 140	85
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	120
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	80
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	40 - 130	100
LB102723.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	95
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	90
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	85
		Dieldrin	mg/kg	0.05	0.18	0.2	60 - 140	90
		Endrin	mg/kg	0.2	0.3	0.2	60 - 140	125
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	75
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	40 - 130	103

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102721.002		Naphthalene	mg/kg	0.1	3.6	4	60 - 140	89
		Acenaphthylene	mg/kg	0.1	3.6	4	60 - 140	91
		Acenaphthene	mg/kg	0.1	3.3	4	60 - 140	82
		Phenanthrene	mg/kg	0.1	3.7	4	60 - 140	91
		Anthracene	mg/kg	0.1	3.5	4	60 - 140	87
		Fluoranthene	mg/kg	0.1	3.5	4	60 - 140	87
		Pyrene	mg/kg	0.1	3.2	4	60 - 140	79
		Benzo(a)pyrene	mg/kg	0.1	3.2	4	60 - 140	79
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	74

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

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

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102722.002		Naphthalene	mg/kg	0.1	3.6	4	60 - 140	89
		Acenaphthylene	mg/kg	0.1	3.6	4	60 - 140	91
		Acenaphthene	mg/kg	0.1	3.3	4	60 - 140	82
		Phenanthrene	mg/kg	0.1	3.7	4	60 - 140	91
		Anthracene	mg/kg	0.1	3.5	4	60 - 140	87
		Fluoranthene	mg/kg	0.1	3.5	4	60 - 140	87
		Pyrene	mg/kg	0.1	3.2	4	60 - 140	79
		Benzo(a)pyrene	mg/kg	0.1	3.2	4	60 - 140	79
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	74
LB102723.002		Naphthalene	mg/kg	0.1	3.6	4	60 - 140	90
		Acenaphthylene	mg/kg	0.1	3.7	4	60 - 140	93
		Acenaphthene	mg/kg	0.1	3.4	4	60 - 140	85
		Phenanthrene	mg/kg	0.1	3.4	4	60 - 140	86
		Anthracene	mg/kg	0.1	3.6	4	60 - 140	89
		Fluoranthene	mg/kg	0.1	3.3	4	60 - 140	82
		Pyrene	mg/kg	0.1	3.5	4	60 - 140	88
		Benzo(a)pyrene	mg/kg	0.1	4.1	4	60 - 140	102
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	78
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	76
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92

PCBs in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102721.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	104
LB102722.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	96
LB102723.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	101

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

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102807.002	Arsenic, As	mg/kg	3	52	50	80 - 120	104
	Cadmium, Cd	mg/kg	0.3	51	50	80 - 120	102
	Chromium, Cr	mg/kg	0.3	51	50	80 - 120	101
	Copper, Cu	mg/kg	0.5	52	50	80 - 120	103
	Lead, Pb	mg/kg	1	51	50	80 - 120	101
	Nickel, Ni	mg/kg	0.5	52	50	80 - 120	104
	Zinc, Zn	mg/kg	0.5	52	50	80 - 120	105
LB102808.002	Arsenic, As	mg/kg	3	52	50	80 - 120	105
	Cadmium, Cd	mg/kg	0.3	51	50	80 - 120	103
	Chromium, Cr	mg/kg	0.3	51	50	80 - 120	102
	Copper, Cu	mg/kg	0.5	53	50	80 - 120	105
	Lead, Pb	mg/kg	1	51	50	80 - 120	103
	Nickel, Ni	mg/kg	0.5	52	50	80 - 120	104
	Zinc, Zn	mg/kg	0.5	53	50	80 - 120	105
LB102809.002	Arsenic, As	mg/kg	3	52	50	80 - 120	105
	Cadmium, Cd	mg/kg	0.3	51	50	80 - 120	102
	Chromium, Cr	mg/kg	0.3	51	50	80 - 120	102
	Copper, Cu	mg/kg	0.5	52	50	80 - 120	104
	Lead, Pb	mg/kg	1	51	50	80 - 120	102
	Nickel, Ni	mg/kg	0.5	52	50	80 - 120	104
	Zinc, Zn	mg/kg	0.5	52	50	80 - 120	105
LB102810.002	Arsenic, As	mg/kg	3	52	50	80 - 120	104
	Cadmium, Cd	mg/kg	0.3	51	50	80 - 120	103
	Chromium, Cr	mg/kg	0.3	51	50	80 - 120	102
	Copper, Cu	mg/kg	0.5	52	50	80 - 120	104
	Lead, Pb	mg/kg	1	51	50	80 - 120	102
	Nickel, Ni	mg/kg	0.5	52	50	80 - 120	104
	Zinc, Zn	mg/kg	0.5	53	50	80 - 120	106
LB102812.002	Arsenic, As	mg/kg	3	50	50	80 - 120	101
	Cadmium, Cd	mg/kg	0.3	50	50	80 - 120	100
	Chromium, Cr	mg/kg	0.3	50	50	80 - 120	100

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.

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

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102812.002		Copper, Cu	mg/kg	0.5	51	50	80 - 120	102
		Lead, Pb	mg/kg	1	50	50	80 - 120	101
		Nickel, Ni	mg/kg	0.5	51	50	80 - 120	101
		Zinc, Zn	mg/kg	0.5	51	50	80 - 120	103

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102721.002		TRH C10-C14	mg/kg	20	42	40	60 - 140	105
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	105
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	80
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	42	40	60 - 140	105
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	95
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	80
LB102722.002		TRH C10-C14	mg/kg	20	42	40	60 - 140	105
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	105
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	80
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	42	40	60 - 140	105
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	95
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	80
LB102723.002		TRH C10-C14	mg/kg	20	41	40	60 - 140	103
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	105
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	75
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	42	40	60 - 140	105
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	95
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	70

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102730.002	Monocyclic	Benzene	mg/kg	0.1	2.0	2.9	60 - 140	68
	Aromatic	Toluene	mg/kg	0.1	2.3	2.9	60 - 140	79
		Ethylbenzene	mg/kg	0.1	1.8	2.9	60 - 140	63
		m/p-xylene	mg/kg	0.2	4.6	5.8	60 - 140	79
		o-xylene	mg/kg	0.1	2.1	2.9	60 - 140	74
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	89
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	5	60 - 140	84
		d8-toluene (Surrogate)	mg/kg	-	3.8	5	60 - 140	76
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.4	5	60 - 140	108
LB102733.002	Monocyclic	Benzene	mg/kg	0.1	2.3	2.9	60 - 140	78
	Aromatic	Toluene	mg/kg	0.1	2.9	2.9	60 - 140	101
		Ethylbenzene	mg/kg	0.1	2.5	2.9	60 - 140	84
		m/p-xylene	mg/kg	0.2	5.2	5.8	60 - 140	89
		o-xylene	mg/kg	0.1	2.5	2.9	60 - 140	88
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	91
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	91
		d8-toluene (Surrogate)	mg/kg	-	4.7	5	60 - 140	95
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.9	5	60 - 140	118

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102730.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	88
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	80
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	89
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	5	60 - 140	84
		d8-toluene (Surrogate)	mg/kg	-	3.8	5	60 - 140	76
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.4	5	60 - 140	108
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	122
LB102733.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	87
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	72
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	91
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	91
		d8-toluene (Surrogate)	mg/kg	-	4.7	5	60 - 140	95
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.9	5	60 - 140	118

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.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433/AN434/AN410**

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102733.002	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	83

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

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

Mercury (dissolved) in Water

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE152983.002	LB102855.004	Mercury	mg/L	0.0001	0.0089	-0.0116	0.008	111

Mercury in Soil

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153116.001	LB102867.004	Mercury	mg/kg	0.01	0.25	0.04	0.2	107
SE153116.020	LB102868.004	Mercury	mg/kg	0.01	0.26	0.03	0.2	114
SE153116.039	LB102869.004	Mercury	mg/kg	0.01	0.24	0.04	0.2	99
SE153116.058	LB102870.004	Mercury	mg/kg	0.01	0.26	0.02	0.2	117

OC Pesticides in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE153116.002	LB102721.026		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	<0.1	0.2	90
			Aldrin	mg/kg	0.1	<0.1	0.2	85
			Beta BHC	mg/kg	0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	<0.1	0.2	70
			Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	-	-
			Dieldrin	mg/kg	0.05	<0.05	0.2	75
			Endrin	mg/kg	0.2	<0.2	0.2	90
			o,p'-DDD	mg/kg	0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	<0.1	0.2	130
			Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	-	101
SE153116.027	LB102722.026		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	<0.1	0.2	90
			Aldrin	mg/kg	0.1	<0.1	0.2	90
			Beta BHC	mg/kg	0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	<0.1	0.2	80
			Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	-	-
			Dieldrin	mg/kg	0.05	<0.05	0.2	85
			Endrin	mg/kg	0.2	<0.2	0.2	100
			o,p'-DDD	mg/kg	0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	-	-

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]AN400/AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE153116.027	LB102722.026		p,p'-DDT	mg/kg	0.1	<0.1	0.2	65
			Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	-	104

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE153091.002	LB102723.026		Naphthalene	mg/kg	0.1	0	4	89
			2-methylnaphthalene	mg/kg	0.1	0	-	-
			1-methylnaphthalene	mg/kg	0.1	0	-	-
			Acenaphthylene	mg/kg	0.1	0	4	93
			Acenaphthene	mg/kg	0.1	0	4	88
			Fluorene	mg/kg	0.1	0	-	-
			Phenanthrene	mg/kg	0.1	0.01	4	87
			Anthracene	mg/kg	0.1	0	4	92
			Fluoranthene	mg/kg	0.1	0.01	4	85
			Pyrene	mg/kg	0.1	0.01	4	90
			Benzo(a)anthracene	mg/kg	0.1	0.01	-	-
			Chrysene	mg/kg	0.1	0	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.01	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	0.01	-	-
			Benzo(a)pyrene	mg/kg	0.1	0	4	104
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	0	-	-
			Benzo(ghi)perylene	mg/kg	0.1	0	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	0	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	0.242	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	0.121	-	-
			Total PAH (18)	mg/kg	0.8	0	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.41	-	80
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.38	-	72
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	-	90

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

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153103.008	LB102807.004	Arsenic, As	mg/kg	3	54	4	50	99
		Cadmium, Cd	mg/kg	0.3	48	<0.3	50	96
		Chromium, Cr	mg/kg	0.3	55	7.0	50	95
		Copper, Cu	mg/kg	0.5	55	5.6	50	99
		Lead, Pb	mg/kg	1	63	17	50	94
		Nickel, Ni	mg/kg	0.5	51	1.4	50	99
		Zinc, Zn	mg/kg	0.5	120	75	50	98
SE153116.003	LB102808.004	Arsenic, As	mg/kg	3	50	5	50	91
		Cadmium, Cd	mg/kg	0.3	44	0.4	50	88
		Chromium, Cr	mg/kg	0.3	53	9.2	50	87
		Copper, Cu	mg/kg	0.5	77	48	50	57 ④
		Lead, Pb	mg/kg	1	110	75	50	66 ④
		Nickel, Ni	mg/kg	0.5	49	4.5	50	89
		Zinc, Zn	mg/kg	0.5	260	220	50	92
SE153116.022	LB102809.004	Arsenic, As	mg/kg	3	49	3	50	92
		Cadmium, Cd	mg/kg	0.3	45	<0.3	50	89
		Chromium, Cr	mg/kg	0.3	52	6.5	50	91
		Copper, Cu	mg/kg	0.5	53	3.5	50	99
		Lead, Pb	mg/kg	1	55	13	50	84
		Nickel, Ni	mg/kg	0.5	47	1.4	50	91
		Zinc, Zn	mg/kg	0.5	65	15	50	100
SE153116.041	LB102810.004	Arsenic, As	mg/kg	3	49	9	50	81
		Cadmium, Cd	mg/kg	0.3	43	0.3	50	86

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 Metals 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%
SE153116.041	LB102810.004	Chromium, Cr	mg/kg	0.3	56	14	50	83
		Copper, Cu	mg/kg	0.5	47	0.6	50	94
		Lead, Pb	mg/kg	1	56	19	50	73
		Nickel, Ni	mg/kg	0.5	45	2.3	50	86
		Zinc, Zn	mg/kg	0.5	53	9.0	50	88
SE153116.062	LB102812.004	Arsenic, As	mg/kg	3	55	8	50	94
		Cadmium, Cd	mg/kg	0.3	51	4.7	50	93
		Chromium, Cr	mg/kg	0.3	63	18	50	91
		Copper, Cu	mg/kg	0.5	85	41	50	88
		Lead, Pb	mg/kg	1	83	46	50	73
		Nickel, Ni	mg/kg	0.5	52	4.5	50	95
		Zinc, Zn	mg/kg	0.5	170	130	50	74

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153054.001	LB102730.004	Monocyclic	Benzene	mg/kg	0.1	2.0	<0.1	2.9	69
		Aromatic	Toluene	mg/kg	0.1	2.6	<0.1	2.9	89
			Ethylbenzene	mg/kg	0.1	1.9	<0.1	2.9	66
			m/p-xylene	mg/kg	0.2	4.9	<0.2	5.8	84
			o-xylene	mg/kg	0.1	2.3	<0.1	2.9	80
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	4.7	-	104
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.0	4.5	-	99
			d8-toluene (Surrogate)	mg/kg	-	4.6	3.9	-	91
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.2	-	90
		Totals	Total Xylenes*	mg/kg	0.3	7.3	<0.3	-	-
			Total BTEX	mg/kg	0.6	14	<0.6	-	-
SE153115.002	LB102733.004	Monocyclic	Benzene	mg/kg	0.1	1.8	<0.1	2.9	63
		Aromatic	Toluene	mg/kg	0.1	2.7	<0.1	2.9	92
			Ethylbenzene	mg/kg	0.1	2.1	<0.1	2.9	73
			m/p-xylene	mg/kg	0.2	4.5	<0.2	5.8	77
			o-xylene	mg/kg	0.1	2.3	<0.1	2.9	78
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.5	3.7	-	70
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.6	3.9	-	73
			d8-toluene (Surrogate)	mg/kg	-	3.7	3.9	-	74
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.2	5.1	-	104
		Totals	Total Xylenes*	mg/kg	0.3	6.7	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153054.001	LB102730.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	86
			TRH C6-C9	mg/kg	20	<20	<20	23.2	77
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	4.7	-	104
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.0	4.5	-	99
			d8-toluene (Surrogate)	mg/kg	-	4.6	3.9	-	91
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.2	-	90
		VPH F	Benzene (F0)	mg/kg	0.1	2.0	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	104
SE153115.002	LB102733.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	84
			TRH C6-C9	mg/kg	20	<20	<20	23.2	69
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.5	3.7	-	70
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.6	3.9	-	73
			d8-toluene (Surrogate)	mg/kg	-	3.7	3.9	-	74
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.2	5.1	-	104
		VPH F	Benzene (F0)	mg/kg	0.1	1.8	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	101

MATRIX SPIKE DUPLICATES

SE153116 R0

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

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

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

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

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
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Project	**13757-2 Warriewood**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

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SGS Reference	**SE153116 R0**
Date Received	01 Jun 2016
Date Reported	10 Jun 2016

COMMENTS

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

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

Sample #27: Asbestos found in 5x3mm cement sheet fragment, in >2 to <7mm fraction.
Sample #64: Asbestos found in 4x2mm cement sheet fragments, in >2 to <7mm fraction.

Samples #59, 61, 70 were ashed after initial stereo microscope examination, re-examined and trace analysis performed on samples where asbestos has not been detected.
No trace asbestos fibres detected using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Yusuf Kuthpudin
Asbestos Analyst

ANALYTICAL REPORT

RESULTS

Fibre ID in bulk materials — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification
SE153116.059	TP25 0.5-0.8 FCP	Other	15x15x4mm cement sheet fragment	30 May 2016	No Asbestos Detected
SE153116.061	TP25 1.0-1.3 FCP	Other	90x40x4mm cement sheet fragments	30 May 2016	No Asbestos Detected
SE153116.063	TP25 1.5-1.8 FCP	Other	50x35x4mm cement sheet fragment	30 May 2016	Amosite & Chrysotile Asbestos Detected
SE153116.070	FCP1 Ground Surface FCP	Other	50x25x4mm Rock material	30 May 2016	No Asbestos Detected

METHOD SUMMARY

SE153116 R0

METHOD	METHODOLOGY SUMMARY
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).

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service.
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

COC received 2/6/16 @ 12:59pm

SGS Alexandria Environmental

SE153116 COC
Received: 01 – Jun – 2016

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH
Job No: 13757/2
Project:
Project Manager: AB
Location: Warriewood

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Sampling details: Soil	Sampling details: Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
1	BH1	0-0.1	31/05/2016	-	SG/SP		✓			✓		✓	✓			YES
2	BH1	0.15-0.25	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
3	BH2	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
	BH2	0.2-0.3	31/05/2016	-	SG/SP											YES
4	BH3	0-0.15	31/05/2016	-	SG/SP		✓			✓						YES
	BH3	0.2-0.3	31/05/2016	-	SG/SP											YES
5	BH4	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
	BH4	0.2-0.3	31/05/2016	-	SG/SP											YES
6	TP5	0-0.15	31/05/2016	-	SG/SP		✓			✓						YES
7	TP5	0.5-0.8	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
8	TP5	1.05-1.15	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
9	BH6	0-0.15	31/05/2016	-	SG/SP		✓			✓						YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Odisho		1/6/16 @ 2pm

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH
Job No: 13757/2
Project:
Project Manager: AB
Location: Warriewood

Results required by: Standard Turnaround Time

	Sampling details			Sample type											
	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
	BH6	0.2-0.3	31/05/2016	-	SG/SP											YES
10	BH7	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
11	BH7	0.3-0.6	31/05/2016	-	SG/SP		✓					✓				YES
12	BH8	0-0.15	31/05/2016	-	SG/SP		✓			✓						YES
	BH8	0.2-0.5	31/05/2016	-	SG/SP											YES
13	TP9	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
	TP9	0.2-0.3	30/05/2016	-	SG/SP											YES
14	TP10	0-0.15	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
15	TP10	0.5-0.8	30/05/2016	-	SG/SP		✓									YES
16	TP10	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
17	TP10	1.5-1.8	30/05/2016	-	SG/SP		✓									YES
18	TP10	1.85-1.95	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Odisho		1/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
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UNIT 16
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ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH Job No: 13757/2

Project:

Project Manager: AB Location: Warriewood

Results required by: Standard Turnaround Time

Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
19	TP11	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
20	TP11	0.5-0.8	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
21	TP11	1.0-1.3	31/05/2016	-	SG/SP		✓									YES
22	TP11	1.45-1.55	31/05/2016	-	SG/SP		✓									YES
23	TP12	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES
	TP12	0.2-0.3	30/05/2016	-	SG/SP											YES
24	TP13	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓	✓			YES
25	TP13	0.2-0.5	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
26	TP13	0.55-0.65	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
27	TP14	0-0.15	30/05/2016	-	SG/SP		✓			✓			✓			YES
28	TP14	0.5-0.8	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
29	TP14	1.05-1.15	30/05/2016	-	SG/SP		✓									YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Celisio		1/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

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PENRITH NSW 2751

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PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH Job No: 13757/2

Project:

Project Manager: AB Location: Warriewood

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
30	TP15	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
	TP15	0.2-0.3	30/05/2016	-	SG/SP											YES
31	TP16	0-0.15	31/05/2016	-	SG/SP		✓			✓						YES
32	TP16	0.5-0.8	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
33	TP16	1.0-1.3	31/05/2016	-	SG/SP		✓									YES
34	TP16	1.5-1.8	31/05/2016	-	SG/SP		✓									YES
35	TP16	2.0-2.2	31/05/2016	-	SG/SP		✓									YES
36	TP16	2.25-2.35	31/05/2016	-	SG/SP		✓									YES
37	TP17	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
38	TP17	0.5-0.8	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
39	TP17	1.0-1.3	31/05/2016	-	SG/SP		✓									YES
40	TP17	1.5-1.8	31/05/2016	-	SG/SP		✓									YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A Odisho		1/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO:	**SGS ENVIRONMENTAL SERVICES** **UNIT 16** **33 MADDOX STREET** **ALEXANDRIA NSW 2015**	**Sampling By:** JH	**Job No:** 13757/2
			Project:
PH:	**02 8594 0400** **FAX: 02 8594 0499**	**Project Manager:** AB	**Location:** Warriewood
ATTN:	**MS EMILY YIN**		

Results required by: Standard Turnaround Time

Sampling details				Sample type											
Location		Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
41	TP17	2.05-2.15	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
42	TP18	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
	TP18	0.2-0.3	30/05/2016	-	SG/SP											YES
43	TP19	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
44	TP19	0.5-0.8	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
45	TP19	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
46	TP19	1.55-1.65	30/05/2016	-	SG/SP		✓									YES
47	TP20	0-0.15	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
48	TP20	0.5-0.8	30/05/2016	-	SG/SP		✓									YES
49	TP20	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
50	TP20	1.55-1.65	30/05/2016	-	SG/SP		✓									YES
51	TP21	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Calisho		1/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH
Job No: 13757/2
Project:
Project Manager: AB
Location: Warriewood

Results required by: Standard Turnaround Time

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Material	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
TP21	0.2-0.3	30/05/2016	-	SG/SP											YES
52 TP22	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
TP22	0.2-0.3	30/05/2016	-	SG/SP											YES
53 TP23	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES
TP23	0.2-0.3	30/05/2016	-	SG/SP											YES
54 TP24	0-0.15	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓		✓			YES
55 TP24	0.5-0.8	30/05/2016	-	SG/SP		✓									YES
56 TP24	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
57 TP24	1.55-1.65	30/05/2016	-	SG/SP		✓									YES
58 TP25	0-0.15	30/05/2016	-	SG/SP		✓			✓			✓			YES
59 TP25	0.5-0.8	30/05/2016	-		FCP								✓		YES
60 TP25	0.5-0.8	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Collins		1/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece (plastic bag)	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13757/2

Project:

Project Manager: AB **Location:** Warriewood

Results required by: Standard Turnaround Time

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Material	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
61 TP25	1.0-1.3	30/05/2016	-		FCP								✓		YES
62 TP25	1.0-1.3	30/05/2016	-	SG/SP		✓						✓			YES
63 TP25	1.5-1.8	30/05/2016	-		FCP								✓		YES
64 TP25	1.5-1.8	30/05/2016	-	SG/SP		✓						✓			YES
65 TP25	1.85-1.95	30/05/2016	-	SG/SP		✓									YES
66 TP26	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓	✓			YES
67 TP26	0.25-0.35	30/05/2016	-	SG/SP		✓									YES
68 TP27	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES
69 TP27	0.35-0.45	30/05/2016	-	SG/SP		✓									YES
70 FCP1	Ground Surface	30/05/2016	-		FCP								✓		YES
71 FCP1	0-0.1	30/05/2016	-	SP								✓			YES
72 Duplicate D1		30/05/2016	-	SG		✓	✓	✓	✓	✓					YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Caish		1/6/16 @ 4pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece (plastic bag)	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13757/2

Project:

Project Manager: AB **Location:** Warriewood

Results required by: Standard Turnaround Time

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
73 Duplicate D2		30/05/2016	-	SG		✓			✓						YES
74 Duplicate D3		30/05/2016	-	SG		✓									YES
75 Duplicate D4		30/05/2016	-	SG		✓									YES
76 Rinsate R1		30/05/2016	-		WG/Vial	✓									YES
77 Rinsate R2		31/05/2016	-		WG/Vial	✓									YES
78 Tripspike TS1				Sand										✓	YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A-Odisho		1/6/16 @ 1pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece (plastic bag)	✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood**
Order Number	(Not specified)
Samples	78

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 1/6/2016
Report Due	Thu 9/6/2016
SGS Reference	**SE153116**

SUBMISSION DETAILS

This is to confirm that 78 samples were received on Wednesday 1/6/2016. Results are expected to be ready by Thursday 9/6/2016. Please quote SGS reference SE153116 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	72 Soil,2 Water,4 FCP	Type of documentation received	COC
Date documentation received	2/6/16@12:59pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	10.2°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

For pH results refer SE153116A.
12 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

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	OC Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Metals in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH1 0-0.1	13	28	-	-	7	-	-	-
002	BH1 0.15-0.25	13	28	25	11	7	10	12	8
003	BH2 0-0.15	13	28	-	-	7	-	-	-
004	BH3 0-0.15	-	28	-	-	7	-	-	-
005	BH4 0-0.15	13	28	-	-	7	-	-	-
006	TP5 0-0.15	-	28	-	-	7	-	-	-
007	TP5 0.5-0.8	13	28	25	11	7	10	12	8
008	TP5 1.05-1.15	13	28	25	11	7	10	12	8
009	BH6 0-0.15	-	28	-	-	7	-	-	-
010	BH7 0-0.15	13	28	-	-	7	-	-	-
011	BH7 0.3-0.6	13	-	-	-	7	-	-	-
012	BH8 0-0.15	-	28	-	-	7	-	-	-
013	TP9 0-0.15	13	28	-	-	7	-	-	-
014	TP10 0-0.15	-	28	25	11	7	10	12	8
015	TP10 0.5-0.8	-	-	-	-	7	-	-	-
016	TP10 1.0-1.3	-	-	-	-	7	-	-	-
017	TP10 1.5-1.8	-	-	-	-	7	-	-	-
018	TP10 1.85-1.95	13	28	25	11	7	10	12	8
019	TP11 0-0.15	13	28	-	-	7	-	-	-
020	TP11 0.5-0.8	13	28	25	11	7	10	12	8
021	TP11 1.0-1.3	-	-	-	-	7	-	-	-
022	TP11 1.45-1.55	-	-	-	-	7	-	-	-
023	TP12 0-0.15	-	28	-	-	7	-	-	-
024	TP13 0-0.15	13	28	-	-	7	-	-	-

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	OC Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Metals in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
025	TP13 0.2-0.5	-	28	25	11	7	10	12	8
026	TP13 0.55-0.65	13	28	25	11	7	10	12	8
027	TP14 0-0.15	-	28	-	-	7	-	-	-
028	TP14 0.5-0.8	13	28	25	11	7	10	12	8
029	TP14 1.05-1.15	-	-	-	-	7	-	-	-
030	TP15 0-0.15	13	28	-	-	7	-	-	-
031	TP16 0-0.15	-	28	-	-	7	-	-	-
032	TP16 0.5-0.8	-	28	25	11	7	10	12	8
033	TP16 1.0-1.3	-	-	-	-	7	-	-	-
034	TP16 1.5-1.8	-	-	-	-	7	-	-	-
035	TP16 2.0-2.2	-	-	-	-	7	-	-	-
036	TP16 2.25-2.35	-	-	-	-	7	-	-	-
037	TP17 0-0.15	13	28	-	-	7	-	-	-
038	TP17 0.5-0.8	13	28	25	11	7	10	12	8
039	TP17 1.0-1.3	-	-	-	-	7	-	-	-
040	TP17 1.5-1.8	-	-	-	-	7	-	-	-
041	TP17 2.05-2.15	13	28	25	11	7	10	12	8
042	TP18 0-0.15	13	28	-	-	7	-	-	-
043	TP19 0-0.15	13	28	-	-	7	-	-	-
044	TP19 0.5-0.8	-	28	25	11	7	10	12	8
045	TP19 1.0-1.3	-	-	-	-	7	-	-	-
046	TP19 1.55-1.65	-	-	-	-	7	-	-	-
047	TP20 0-0.15	13	28	25	11	7	10	12	8
048	TP20 0.5-0.8	-	-	-	-	7	-	-	-

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	OC Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Metals in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
049	TP20 1.0-1.3	-	-	-	-	7	-	-	-
050	TP20 1.55-1.65	-	-	-	-	7	-	-	-
051	TP21 0-0.15	-	28	-	-	7	-	-	-
052	TP22 0-0.15	13	28	-	-	7	-	-	-
053	TP23 0-0.15	-	28	-	-	7	-	-	-
054	TP24 0-0.15	-	28	25	11	7	10	12	8
055	TP24 0.5-0.8	-	-	-	-	7	-	-	-
056	TP24 1.0-1.3	-	-	-	-	7	-	-	-
057	TP24 1.55-1.65	-	-	-	-	7	-	-	-
058	TP25 0-0.15	-	28	-	-	7	-	-	-
060	TP25 0.5-0.8	13	28	25	11	7	10	12	8
062	TP25 1.0-1.3	-	-	-	-	7	-	-	-
064	TP25 1.5-1.8	-	-	-	-	7	-	-	-
065	TP25 1.85-1.5	-	-	-	-	7	-	-	-
066	TP26 0-0.15	13	28	-	-	7	-	-	-
067	TP26 0.25-0.35	-	-	-	-	7	-	-	-
068	TP27 0-0.15	-	28	-	-	7	-	-	-
069	TP27 0.35-0.45	-	-	-	-	7	-	-	-
072	Duplicate D1	-	28	25	11	7	10	12	8

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	Total Recoverable Metals in Soil/Waste	VOC's in Soil
073	Duplicate D2	28	7	-
074	Duplicate D3	-	7	-
075	Duplicate D4	-	7	-
078	Tripspike TS1	-	-	12

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Gravimetric Determination of Asbestos in Soil	Mercury in Soil	Moisture Content
001	BH1 0-0.1	9	1	1
002	BH1 0.15-0.25	9	1	1
003	BH2 0-0.15	-	1	1
004	BH3 0-0.15	-	1	1
005	BH4 0-0.15	-	1	1
006	TP5 0-0.15	-	1	1
007	TP5 0.5-0.8	-	1	1
008	TP5 1.05-1.15	9	1	1
009	BH6 0-0.15	-	1	1
010	BH7 0-0.15	-	1	1
011	BH7 0.3-0.6	-	1	1
012	BH8 0-0.15	-	1	1
013	TP9 0-0.15	-	1	1
014	TP10 0-0.15	-	1	1
015	TP10 0.5-0.8	-	1	1
016	TP10 1.0-1.3	-	1	1
017	TP10 1.5-1.8	-	1	1
018	TP10 1.85-1.95	9	1	1
019	TP11 0-0.15	-	1	1
020	TP11 0.5-0.8	-	1	1
021	TP11 1.0-1.3	-	1	1
022	TP11 1.45-1.55	-	1	1
023	TP12 0-0.15	-	1	1
024	TP13 0-0.15	9	1	1

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Gravimetric Determination of Asbestos in Soil	Mercury in Soil	Moisture Content
025	TP13 0.2-0.5	-	1	1
026	TP13 0.55-0.65	9	1	1
027	TP14 0-0.15	9	1	1
028	TP14 0.5-0.8	-	1	1
029	TP14 1.05-1.15	-	1	1
030	TP15 0-0.15	-	1	1
031	TP16 0-0.15	-	1	1
032	TP16 0.5-0.8	-	1	1
033	TP16 1.0-1.3	-	1	1
034	TP16 1.5-1.8	-	1	1
035	TP16 2.0-2.2	-	1	1
036	TP16 2.25-2.35	-	1	1
037	TP17 0-0.15	-	1	1
038	TP17 0.5-0.8	-	1	1
039	TP17 1.0-1.3	-	1	1
040	TP17 1.5-1.8	-	1	1
041	TP17 2.05-2.15	9	1	1
042	TP18 0-0.15	-	1	1
043	TP19 0-0.15	-	1	1
044	TP19 0.5-0.8	-	1	1
045	TP19 1.0-1.3	-	1	1
046	TP19 1.55-1.65	-	1	1
047	TP20 0-0.15	-	1	1
048	TP20 0.5-0.8	-	1	1

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre ID in bulk materials	Gravimetric Determination of Asbestos in Soil	Mercury in Soil	Moisture Content
049	TP20 1.0-1.3	-	-	1	1
050	TP20 1.55-1.65	-	-	1	1
051	TP21 0-0.15	-	-	1	1
052	TP22 0-0.15	-	-	1	1
053	TP23 0-0.15	-	-	1	1
054	TP24 0-0.15	-	9	1	1
055	TP24 0.5-0.8	-	-	1	1
056	TP24 1.0-1.3	-	-	1	1
057	TP24 1.55-1.65	-	-	1	1
058	TP25 0-0.15	-	9	1	1
059	TP25 0.5-0.8 FCP	1	-	-	-
060	TP25 0.5-0.8	-	9	1	1
061	TP25 1.0-1.3 FCP	1	-	-	-
062	TP25 1.0-1.3	-	9	1	1
063	TP25 1.5-1.8 FCP	1	-	-	-
064	TP25 1.5-1.8	-	9	1	1
065	TP25 1.85-1.5	-	-	1	1
066	TP26 0-0.15	-	9	1	1
067	TP26 0.25-0.35	-	-	1	1
068	TP27 0-0.15	-	-	1	1
069	TP27 0.35-0.45	-	-	1	1
070	FCP1 Ground Surface FCP	1	-	-	-
071	FCP1 0-0.1	-	9	-	-
072	Duplicate D1	-	-	1	1

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE153116

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Mercury in Soil	Metals in Water (Dissolved) by ICPOES	Moisture Content
073	Duplicate D2	-	1	-	1
074	Duplicate D3	-	1	-	1
075	Duplicate D4	-	1	-	1
076	Rinsate R1	1	-	7	-
077	Rinsate R2	1	-	7	-

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ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood - pH**
Order Number	(Not specified)
Samples	78

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	**SE153116A R0**
Date Received	1/6/2016
Date Reported	6/6/2016

COMMENTS

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

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

pH in soil (1:5) [AN101] Tested: 6/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116A.001	BH1 0.15-0.25 SOIL - 31/5/2016 SE153116A.002	BH2 0-0.15 SOIL - 31/5/2016 SE153116A.003	BH4 0-0.15 SOIL - 31/5/2016 SE153116A.005	TP5 0.5-0.8 SOIL - 31/5/2016 SE153116A.007
pH	pH Units	-	7.4	8.0	7.4	6.6	8.3

PARAMETER	UOM	LOR	TP5 1.05-1.15 SOIL - 31/5/2016 SE153116A.008	BH7 0-0.15 SOIL - 31/5/2016 SE153116A.010	BH7 0.3-0.6 SOIL - 31/5/2016 SE153116A.011	TP9 0-0.15 SOIL - 30/5/2016 SE153116A.013	TP10 1.85-1.95 SOIL - 30/5/2016 SE153116A.018
pH	pH Units	-	7.3	6.2	6.2	7.7	8.4

PARAMETER	UOM	LOR	TP11 0-0.15 SOIL - 30/5/2016 SE153116A.019	TP11 0.5-0.8 SOIL - 30/5/2016 SE153116A.020	TP13 0-0.15 SOIL - 30/5/2016 SE153116A.024	TP13 0.55-0.65 SOIL - 30/5/2016 SE153116A.026	TP14 0.5-0.8 SOIL - 30/5/2016 SE153116A.028
pH	pH Units	-	7.6	8.0	8.7	7.6	7.7

PARAMETER	UOM	LOR	TP15 0-0.15 SOIL - 30/5/2016 SE153116A.030	TP17 0-0.15 SOIL - 31/5/2016 SE153116A.037	TP17 0.5-0.8 SOIL - 31/5/2016 SE153116A.038	TP17 2.05-2.15 SOIL - 31/5/2016 SE153116A.041	TP18 0-0.15 SOIL - 30/5/2016 SE153116A.042
pH	pH Units	-	6.8	7.9	7.0	5.3	6.2

PARAMETER	UOM	LOR	TP19 0-0.15 SOIL - 30/5/2016 SE153116A.043	TP20 0-0.15 SOIL - 30/5/2016 SE153116A.047	TP22 0-0.15 SOIL - 30/5/2016 SE153116A.052	TP25 0.5-0.8 SOIL - 30/5/2016 SE153116A.060	TP26 0-0.15 SOIL - 30/5/2016 SE153116A.066
pH	pH Units	-	8.6	7.7	6.3	7.9	6.8

METHOD	METHODOLOGY SUMMARY
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.

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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE153116A R0

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood - pH**
Order Number	(Not specified)
Samples	78

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	**SE153116A R0**
Date Received	01 Jun 2016
Date Reported	06 Jun 2016

COMMENTS

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

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

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

SAMPLE SUMMARY

Sample counts by matrix	25 Soils	Type of documentation received	COC
Date documentation received	2/6/16@12:59pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	10.2°C
Sample container provider	SGS	Turnaround time requested	Two Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE153116A 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.

pH in soil (1:5) — **Method: ME-(AU)-[ENV]AN101**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1 0-0.1	SE153116A.001	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
BH1 0.15-0.25	SE153116A.002	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
BH2 0-0.15	SE153116A.003	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
BH4 0-0.15	SE153116A.005	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP5 0.5-0.8	SE153116A.007	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP5 1.05-1.15	SE153116A.008	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
BH7 0-0.15	SE153116A.010	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
BH7 0.3-0.6	SE153116A.011	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP9 0-0.15	SE153116A.013	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP10 1.85-1.95	SE153116A.018	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP11 0-0.15	SE153116A.019	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP11 0.5-0.8	SE153116A.020	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP13 0-0.15	SE153116A.024	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP13 0.55-0.65	SE153116A.026	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP14 0.5-0.8	SE153116A.028	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP15 0-0.15	SE153116A.030	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP17 0-0.15	SE153116A.037	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP17 0.5-0.8	SE153116A.038	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP17 2.05-2.15	SE153116A.041	LB102650	31 May 2016	01 Jun 2016	07 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP18 0-0.15	SE153116A.042	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP19 0-0.15	SE153116A.043	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP20 0-0.15	SE153116A.047	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP22 0-0.15	SE153116A.052	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP25 0.5-0.8	SE153116A.060	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016
TP26 0-0.15	SE153116A.066	LB102650	30 May 2016	01 Jun 2016	06 Jun 2016	06 Jun 2016	07 Jun 2016	06 Jun 2016

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

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

No surrogates were required for this job.

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.

No method blanks were required for this job.

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.

pH in soil (1:5) — **Method: ME-(AU)-[ENV]AN101**

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153116A.018	LB102650.014	pH	pH Units	-	8.4	8.4	31	0
SE153116A.042	LB102650.025	pH	pH Units	-	6.2	6.2	32	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.

pH in soil (1:5) — **Method: ME-(AU)-[ENV]AN101**

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB102650.003	pH	pH Units	-	7.5	7.415	98 - 102	101
LB102650.030	pH	pH Units	-	7.5	7.415	98 - 102	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.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE153116A R0

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

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

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

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

SGS Alexandria Environmental

SE153116A COC
Received: 01–Jun–2016

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH
Job No: 13757/2
Project:
Project Manager: AB
Location: Warriewood

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Sample type: Soil	Sample type: Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
1	BH1	0-0.1	31/05/2016	-	SG/SP		✓			✓		✓	✓			YES
2	BH1	0.15-0.25	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
3	BH2	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
	BH2	0.2-0.3	31/05/2016	-	SG/SP					✓		✓				YES
4	BH3	0-0.15	31/05/2016	-	SG/SP		✓									YES
	BH3	0.2-0.3	31/05/2016	-	SG/SP					✓						YES
5	BH4	0-0.15	31/05/2016	-	SG/SP		✓									YES
	BH4	0.2-0.3	31/05/2016	-	SG/SP					✓		✓				YES
6	TP5	0-0.15	31/05/2016	-	SG/SP		✓									YES
7	TP5	0.5-0.8	31/05/2016	-	SG/SP		✓			✓						YES
8	TP5	1.05-1.15	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
9	BH6	0-0.15	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
										✓						YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Odisho		1/6/16 @ 2pm

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

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PENRITH NSW 2751

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TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH Job No: 13757/2

Project:

Project Manager: AB Location: Warriewood

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Sample type: Soil	Sample type: Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
	BH6	0.2-0.3	31/05/2016	-	SG/SP											YES
10	BH7	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
11	BH7	0.3-0.6	31/05/2016	-	SG/SP		✓					✓				YES
12	BH8	0-0.15	31/05/2016	-	SG/SP		✓			✓						YES
	BH8	0.2-0.5	31/05/2016	-	SG/SP											YES
13	TP9	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
	TP9	0.2-0.3	30/05/2016	-	SG/SP											YES
14	TP10	0-0.15	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
15	TP10	0.5-0.8	30/05/2016	-	SG/SP		✓									YES
16	TP10	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
17	TP10	1.5-1.8	30/05/2016	-	SG/SP		✓									YES
18	TP10	1.85-1.95	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
1																YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Odisho		1/6/16 @ 2pm

Legend:

WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
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PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH Job No: 13757/2

Project:

Project Manager: AB Location: Warriewood

Results required by: Standard Turnaround Time

	Sampling details				Sample type											
	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
19	TP11	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
20	TP11	0.5-0.8	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
21	TP11	1.0-1.3	31/05/2016	-	SG/SP		✓									YES
22	TP11	1.45-1.55	31/05/2016	-	SG/SP		✓									YES
23	TP12	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES
	TP12	0.2-0.3	30/05/2016	-	SG/SP											YES
24	TP13	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓	✓			YES
25	TP13	0.2-0.5	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
26	TP13	0.55-0.65	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
27	TP14	0-0.15	30/05/2016	-	SG/SP		✓			✓			✓			YES
28	TP14	0.5-0.8	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
29	TP14	1.05-1.15	30/05/2016	-	SG/SP		✓									YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Celisho		1/6/16 @ 2pm

Legend:

WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

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ATTN: MS EMILY YIN

Sampling By: JH Job No: 13757/2

Project:

Project Manager: AB Location: Warriewood

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Sample type: Soil	Sample type: Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
30	TP15	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
	TP15	0.2-0.3	30/05/2016	-	SG/SP											YES
31	TP16	0-0.15	31/05/2016	-	SG/SP		✓			✓						YES
32	TP16	0.5-0.8	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
33	TP16	1.0-1.3	31/05/2016	-	SG/SP		✓									YES
34	TP16	1.5-1.8	31/05/2016	-	SG/SP		✓									YES
35	TP16	2.0-2.2	31/05/2016	-	SG/SP		✓									YES
36	TP16	2.05-2.15	31/05/2016	-	SG/SP		✓									YES
37	TP17	0-0.15	31/05/2016	-	SG/SP		✓			✓		✓				YES
38	TP17	0.5-0.8	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
39	TP17	1.0-1.3	31/05/2016	-	SG/SP		✓									YES
40	TP17	1.5-1.8	31/05/2016	-	SG/SP		✓									YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. COLISTO		1/6/16 @ 2pm

Legend:

WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

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PENRITH NSW 2751

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TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH
Job No: 13757/2
Project:
Project Manager: AB
Location: Warriewood

Results required by: Standard Turnaround Time

Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
41	TP17	2.05-2.15	31/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓			YES
42	TP18	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
	TP18	0.2-0.3	30/05/2016	-	SG/SP											YES
43	TP19	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
44	TP19	0.5-0.8	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓					YES
45	TP19	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
46	TP19	1.55-1.65	30/05/2016	-	SG/SP		✓									YES
47	TP20	0-0.15	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓				YES
48	TP20	0.5-0.8	30/05/2016	-	SG/SP		✓									YES
49	TP20	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
50	TP20	1.55-1.65	30/05/2016	-	SG/SP		✓									YES
51	TP21	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Edisho		1/6/16 @ 2pm

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

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PENRITH NSW 2750

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PENRITH NSW 2751

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TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH Job No: 13757/2

Project:

Project Manager: AB Location: Warriewood

Results required by: Standard Turnaround Time

Sampling details				Sample type											
	Location	Depth (m)	Date	Time	Soil	Material	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
	TP21	0.2-0.3	30/05/2016	-	SG/SP											YES
S2	TP22	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓				YES
	TP22	0.2-0.3	30/05/2016	-	SG/SP											YES
S3	TP23	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES
	TP23	0.2-0.3	30/05/2016	-	SG/SP											YES
S4	TP24	0-0.15	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓		✓			YES
S5	TP24	0.5-0.8	30/05/2016	-	SG/SP		✓									YES
S6	TP24	1.0-1.3	30/05/2016	-	SG/SP		✓									YES
S7	TP24	1.55-1.65	30/05/2016	-	SG/SP		✓									YES
S8	TP25	0-0.15	30/05/2016	-	SG/SP		✓									YES
S9	TP25	0.5-0.8	30/05/2016	-		FCP				✓			✓			YES
60	TP25	0.5-0.8	30/05/2016	-	SG/SP		✓	✓	✓	✓	✓	✓	✓	✓		YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Ochisno		1/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece (plastic bag)	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

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PENRITH NSW 2751

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TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH

Job No: 13757/2

Project:

Project Manager: AB

Location: Warriewood

Results required by: Standard Turnaround Time

Sampling details				Sample type											
	Location	Depth (m)	Date	Time	Soil	Material	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
61	TP25	1.0-1.3	30/05/2016	-		FCP								✓		YES
62	TP25	1.0-1.3	30/05/2016	-	SG/SP		✓						✓			YES
63	TP25	1.5-1.8	30/05/2016	-		FCP								✓		YES
64	TP25	1.5-1.8	30/05/2016	-	SG/SP		✓						✓			YES
65	TP25	1.85-1.95	30/05/2016	-	SG/SP		✓						✓			YES
66	TP26	0-0.15	30/05/2016	-	SG/SP		✓			✓		✓	✓			YES
67	TP26	0.25-0.35	30/05/2016	-	SG/SP		✓									YES
68	TP27	0-0.15	30/05/2016	-	SG/SP		✓			✓						YES
69	TP27	0.35-0.45	30/05/2016	-	SG/SP		✓									YES
70	FCP1	Ground Surface	30/05/2016	-		FCP								✓		YES
71	FCP1	0-0.1	30/05/2016	-	SP								✓			YES
72	Duplicate D1		30/05/2016	-	SG		✓	✓	✓	✓	✓					YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	A. Caish		1/6/16 @ 4pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece (plastic bag)	✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE153116A

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood - pH**
Order Number	(Not specified)
Samples	78

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 1/6/2016
Report Due	Mon 6/6/2016
SGS Reference	**SE153116A**

SUBMISSION DETAILS

This is to confirm that 78 samples were received on Wednesday 1/6/2016. Results are expected to be ready by Monday 6/6/2016. Please quote SGS reference SE153116A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	25 Soils	Type of documentation received	COC
Date documentation received	2/6/16@12:59pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	10.2°C
Sample container provider	SGS	Turnaround time requested	Two Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE153116A

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood - pH

SUMMARY OF ANALYSIS

No.	Sample ID	pH in soil (1:5)
001	BH1 0-0.1	1
002	BH1 0.15-0.25	1
003	BH2 0-0.15	1
005	BH4 0-0.15	1
007	TP5 0.5-0.8	1
008	TP5 1.05-1.15	1
010	BH7 0-0.15	1
011	BH7 0.3-0.6	1
013	TP9 0-0.15	1
018	TP10 1.85-1.95	1
019	TP11 0-0.15	1
020	TP11 0.5-0.8	1
024	TP13 0-0.15	1

CONTINUED OVERLEAF

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

SAMPLE RECEIPT ADVICE

SE153116A

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood - pH

SUMMARY OF ANALYSIS

No.	Sample ID	pH in soil (1:5)
026	TP13 0.55-0.65	1
028	TP14 0.5-0.8	1
030	TP15 0-0.15	1
037	TP17 0-0.15	1
038	TP17 0.5-0.8	1
041	TP17 2.05-2.15	1
042	TP18 0-0.15	1
043	TP19 0-0.15	1
047	TP20 0-0.15	1

CONTINUED OVERLEAF

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

SAMPLE RECEIPT ADVICE

SE153116A

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood - pH

SUMMARY OF ANALYSIS

No.	Sample ID	pH in soil (1:5)
052	TP22 0-0.15	1
060	TP25 0.5-0.8	1
066	TP26 0-0.15	1

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

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood - Additional**
Order Number	(Not specified)
Samples	79

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	**SE153116B R0**
Date Received	14/6/2016
Date Reported	16/6/2016

COMMENTS

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

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 15/6/2016

PARAMETER	UOM	LOR	BH1 0-0.1 SOIL - 31/5/2016 SE153116B.001	BH7 0.3-0.6 SOIL - 31/5/2016 SE153116B.011	BH8 0.2-0.5 SOIL - 30/5/2016 SE153116B.079
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	**0.2**	<0.1	<0.1
Pyrene	mg/kg	0.1	**0.2**	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	**0.1**	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	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
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 15/6/2016

PARAMETER	UOM	LOR	BH8 0.2-0.5 SOIL - 30/5/2016 SE153116B.079
Arsenic, As	mg/kg	3	**4**
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.3	**13**
Copper, Cu	mg/kg	0.5	**5.3**
Lead, Pb	mg/kg	1	**22**
Nickel, Ni	mg/kg	0.5	**1.3**
Zinc, Zn	mg/kg	0.5	**11**

Mercury in Soil [AN312] Tested: 15/6/2016

PARAMETER	UOM	LOR	BH8 0.2-0.5 SOIL - 30/5/2016 SE153116B.079
Mercury	mg/kg	0.01	**0.02**

Moisture Content [AN002] Tested: 15/6/2016

PARAMETER	UOM	LOR	BH8 0.2-0.5 SOIL - 30/5/2016 SE153116B.079
% Moisture	%w/w	0.5	10

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.
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.
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
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	Carcinogenic PAHs may be expressed as Benzo(a)pyrene equivalents by applying the BaP toxicity equivalence factor (NEPM 1999, June 2013, B7). These can be reported as the individual PAHs and as a sum of carcinogenic PAHs. The sum is reported three ways, the first assuming all <LOR results are zero, the second assuming all < LOR results are half the LOR and the third assuming all <LOR results are the LOR.

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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE153116B R0

CLIENT DETAILS

Contact	Anwar Barbhuyia
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Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood - Additional**
Order Number	(Not specified)
Samples	79

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
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Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE153116B R0**
Date Received	14 Jun 2016
Date Reported	16 Jun 2016

COMMENTS

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

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

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

Extraction Date	Moisture Content	1 item
	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	3 items
Duplicate	Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES	1 item

SAMPLE SUMMARY

Sample counts by matrix	3 Soils	Type of documentation received	COC
Date documentation received	14/6/16@4:47pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	10.2°C
Sample container provider	SGS	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE153116B R0

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

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

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

Mercury in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH8 0.2-0.5	SE153116B.079	LB103214	30 May 2016	14 Jun 2016	27 Jun 2016	15 Jun 2016	27 Jun 2016	16 Jun 2016

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH8 0.2-0.5	SE153116B.079	LB103218	30 May 2016	14 Jun 2016	13 Jun 2016	15 Jun 2016†	20 Jun 2016	16 Jun 2016

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
BH1 0-0.1	SE153116B.001	LB103230	31 May 2016	14 Jun 2016	14 Jun 2016	15 Jun 2016†	25 Jul 2016	16 Jun 2016
BH7 0.3-0.6	SE153116B.011	LB103230	31 May 2016	14 Jun 2016	14 Jun 2016	15 Jun 2016†	25 Jul 2016	16 Jun 2016
BH8 0.2-0.5	SE153116B.079	LB103230	30 May 2016	14 Jun 2016	13 Jun 2016	15 Jun 2016†	25 Jul 2016	16 Jun 2016

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

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH8 0.2-0.5	SE153116B.079	LB103222	30 May 2016	14 Jun 2016	26 Nov 2016	15 Jun 2016	26 Nov 2016	16 Jun 2016

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

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

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1 0-0.1	SE153116B.001	%	70 - 130%	72
	BH7 0.3-0.6	SE153116B.011	%	70 - 130%	78
	BH8 0.2-0.5	SE153116B.079	%	70 - 130%	84
d14-p-terphenyl (Surrogate)	BH1 0-0.1	SE153116B.001	%	70 - 130%	80
	BH7 0.3-0.6	SE153116B.011	%	70 - 130%	106
	BH8 0.2-0.5	SE153116B.079	%	70 - 130%	114
d5-nitrobenzene (Surrogate)	BH1 0-0.1	SE153116B.001	%	70 - 130%	78
	BH7 0.3-0.6	SE153116B.011	%	70 - 130%	90
	BH8 0.2-0.5	SE153116B.079	%	70 - 130%	94

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 in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB103214.001	Mercury	mg/kg	0.01	<0.01

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB103230.001		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)	%	-	78
		2-fluorobiphenyl (Surrogate)	%	-	76
		d14-p-terphenyl (Surrogate)	%	-	92

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

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

Sample Number	Parameter	Units	LOR	Result
LB103222.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

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 in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153285.008	LB103214.014	Mercury	mg/kg	0.01	0.02	0.03	200	0
SE153285.016	LB103214.023	Mercury	mg/kg	0.01	0.01	0.01	200	0

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153461.001	LB103218.030	% Moisture	%w/w	0.5	20	17	35	16

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153461.001	LB103230.016		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	TEQ (mg/kg)	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	200	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	7
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	11
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2

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

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153285.008	LB103222.014	Arsenic, As	mg/kg	3	10	9	40	7
		Cadmium, Cd	mg/kg	0.3	0.8	0.6	70	27
		Chromium, Cr	mg/kg	0.3	17	16	33	6
		Copper, Cu	mg/kg	0.5	27	25	32	5
		Lead, Pb	mg/kg	1	150	250	30	48 ②
		Nickel, Ni	mg/kg	0.5	25	20	32	20
		Zinc, Zn	mg/kg	0.5	110	87	32	26
SE153285.017	LB103222.024	Arsenic, As	mg/kg	3	7	7	44	7
		Cadmium, Cd	mg/kg	0.3	0.5	0.5	86	3
		Chromium, Cr	mg/kg	0.3	13	14	34	8
		Copper, Cu	mg/kg	0.5	25	24	32	2
		Lead, Pb	mg/kg	1	21	22	35	4
		Nickel, Ni	mg/kg	0.5	6.1	6.6	38	7
		Zinc, Zn	mg/kg	0.5	45	45	34	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 %
LB103214.002	Mercury	mg/kg	0.01	0.21	0.2	70 - 130	103

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103230.002		Naphthalene	mg/kg	0.1	3.7	4	60 - 140	92
		Acenaphthylene	mg/kg	0.1	3.6	4	60 - 140	91
		Acenaphthene	mg/kg	0.1	3.6	4	60 - 140	90
		Phenanthrene	mg/kg	0.1	3.7	4	60 - 140	93
		Anthracene	mg/kg	0.1	3.7	4	60 - 140	93
		Fluoranthene	mg/kg	0.1	3.7	4	60 - 140	94
		Pyrene	mg/kg	0.1	3.6	4	60 - 140	89
		Benzo(a)pyrene	mg/kg	0.1	3.8	4	60 - 140	95
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	72
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	74
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	88

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

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103222.002	Arsenic, As	mg/kg	3	53	50	80 - 120	107
	Cadmium, Cd	mg/kg	0.3	56	50	80 - 120	112
	Chromium, Cr	mg/kg	0.3	48	50	80 - 120	95
	Copper, Cu	mg/kg	0.5	48	50	80 - 120	96
	Lead, Pb	mg/kg	1	55	50	80 - 120	110
	Nickel, Ni	mg/kg	0.5	51	50	80 - 120	103
	Zinc, Zn	mg/kg	0.5	49	50	80 - 120	98

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%
SE153116B.07	LB103214.004	Mercury	mg/kg	0.01	0.22	0.02	0.2	102

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

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153116B.07	LB103222.004	Arsenic, As	mg/kg	3	58	4	50	107
9		Cadmium, Cd	mg/kg	0.3	57	<0.3	50	114
		Chromium, Cr	mg/kg	0.3	61	13	50	96
		Copper, Cu	mg/kg	0.5	56	5.3	50	102
		Lead, Pb	mg/kg	1	76	22	50	108
		Nickel, Ni	mg/kg	0.5	53	1.3	50	103
		Zinc, Zn	mg/kg	0.5	58	11	50	95

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

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

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

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

COC received 14/6/16 @ 4.47pm

SGS Alexandria Environmental

SE153116B COC
Received: 14 – Jun – 2016

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH
Job No: 13757/2
Project:
Project Manager: AB
Location: Warriewood

Results required by: 16 June 2016
SGS Ref No: SE153116

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
BH1	0-0.1	31/05/2016	-	SG/SP				✓							YES
BH1	0.15-0.25	31/05/2016	-	SG/SP											YES
BH2	0-0.15	31/05/2016	-	SG/SP											YES
BH2	0.2-0.3	31/05/2016	-	SG/SP											YES
BH3	0-0.15	31/05/2016	-	SG/SP											YES
BH3	0.2-0.3	31/05/2016	-	SG/SP											YES
BH4	0-0.15	31/05/2016	-	SG/SP											YES
BH4	0.2-0.3	31/05/2016	-	SG/SP											YES
TP5	0-0.15	31/05/2016	-	SG/SP											YES
TP5	0.5-0.8	31/05/2016	-	SG/SP											YES
TP5	1.05-1.15	31/05/2016	-	SG/SP											YES
BH6	0-0.15	31/05/2016	-	SG/SP											YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	14/06/2016			14/6/16 4:47pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH
Job No: 13757/2
Project:
Project Manager: AB
Location: Warriewood

Results required by: 16 June 2016
SGS Ref No: SE153116

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	ASBESTOS	BTEX	KEEP SAMPLE
BH6	0.2-0.3	31/05/2016	-	SG/SP											YES
BH7	0-0.15	31/05/2016	-	SG/SP											YES
BH7	0.3-0.6	31/05/2016	-	SG/SP				✓							YES
BH8	0-0.15	31/05/2016	-	SG/SP											YES
BH8	0.2-0.5	31/05/2016	-	SG/SP		✓		✓							YES
TP9	0-0.15	30/05/2016	-	SG/SP											YES
TP9	0.2-0.3	30/05/2016	-	SG/SP											YES
TP10	0-0.15	30/05/2016	-	SG/SP											YES
TP10	0.5-0.8	30/05/2016	-	SG/SP											YES
TP10	1.0-1.3	30/05/2016	-	SG/SP											YES
TP10	1.5-1.8	30/05/2016	-	SG/SP											YES
TP10	1.85-1.95	30/05/2016	-	SG/SP											YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	14/06/2016			14/6/16

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

SAMPLE RECEIPT ADVICE

SE153116B

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood - Additional**
Order Number	(Not specified)
Samples	79

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 14/6/2016
Report Due	Thu 16/6/2016
SGS Reference	**SE153116B**

SUBMISSION DETAILS

This is to confirm that 79 samples were received on Tuesday 14/6/2016. Results are expected to be ready by Thursday 16/6/2016. Please quote SGS reference SE153116B when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	3 Soils	Type of documentation received	COC
Date documentation received	14/6/16@4:47pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	10.2°C
Sample container provider	SGS	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE153116B

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	PAH (Polynuclear Aromatic Hydrocarbons) in Soil
001	BH1 0-0.1	25
011	BH7 0.3-0.6	25

CONTINUED OVERLEAF

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

SAMPLE RECEIPT ADVICE

SE153116B

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury in Soil	Moisture Content	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	Total Recoverable Metals in Soil/Waste
079	BH8 0.2-0.5	1	1	25	7

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

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood**
Order Number	(Not specified)
Samples	2

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	**SE153339 R0**
Date Received	8/6/2016
Date Reported	15/6/2016

COMMENTS

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

No respirable fibres detected in soil sample using trace analysis technique as per AS 4964-2004.

Sample #2: Asbestos found in 5x3mm cement sheet fragments, in >2 to <7mm fraction.

Asbestos analysed by Approved Identifiers Ravee Sivasubramaniam and Yusuf Kuthpudin .

SIGNATORIES

Ravee Sivasubramaniam
Hygiene Team Leader

Fibre ID in bulk materials [AN602] Tested: 15/6/2016

PARAMETER	UOM	LOR	FCP2 Ground Surface MATERIAL - 7/6/2016 SE153339.001
Asbestos Detected	No unit	-	Yes

Gravimetric Determination of Asbestos in Soil [AN605] Tested: 10/6/2016

PARAMETER	UOM	LOR	FCP2 0-0.1 SOIL - 7/6/2016 SE153339.002
Total Sample Weight	g	1	**595**
ACM in >7mm Sample*	g	0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	**0.0410**
AF/FA in <2mm Sample*	g	0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	**0.007**
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	**0.007**
Fibre Type	No unit	-	CRY

METHOD	METHODOLOGY SUMMARY
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).
AN605	This technique gravimetrically determines the mass of Asbestos Containing Material retained on a 7mm Sieve and assumes that 15% of this ACM is asbestos. This calculated asbestos weight is then calculated as a percentage of the total sample weight.
AN605	This technique also gravimetrically determines the mass of Fibrous Asbestos (FA) and Asbestos Fines (AF) Containing Material retained on and passing a 2mm sieve post 7mm sieving. Assumes that FA and AF are 100% asbestos containing. This calculated asbestos weight is then calculated as a percentage of the total sample weight. This does not include free fibres which are only observed by standard trace analysis as per AN 602.
AN605	AMO = Amosite Detected CRY = Chrysotile Detected CRO = Crocidolite Detected ORG = Organic Fibres Detected SMF = Synthetic Mineral Fibres Detected UMF = Unknown Mineral Fibres Detected NAD = No Asbestos Detected
AN605	Insofar as is technically feasible, this report is consistent with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009.

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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/en/terms-and-conditions. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

This report must not be reproduced, except in full.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood**
Order Number	(Not specified)
Samples	1

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	**SE153339 R0**
Date Received	08 Jun 2016
Date Reported	15 Jun 2016

COMMENTS

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

No respirable fibres detected in soil sample using trace analysis technique as per AS 4964-2004.

Sample #2: Asbestos found in 5x3mm cement sheet fragments, in >2 to <7mm fraction.

Asbestos analysed by Approved Identifiers Ravee Sivasubramaniam and Yusuf Kuthpudin .

SIGNATORIES

S. Ravesubra.

Ravee Sivasubramaniam
Hygiene Team Leader

ANALYTICAL REPORT

RESULTS

Fibre ID in bulk materials — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification
SE153339.001	FCP2 Ground Surface	Other	80x50x4mm cement sheet fragment	07 Jun 2016	Chrysotile Asbestos Detected

METHOD SUMMARY

SE153339 R0

METHOD	METHODOLOGY SUMMARY
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).

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service.
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

COC received 9/6/16 @ 9:32 am

SGS Alexandria Environmental

SE153339 COC
Received: 08 – Jun – 2016

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13757/2

Project:

Project Manager: AB **Location:** Warriewood

Results required by: 15 June 2016 (3 Days Turnaround Time)

	Location	Depth (m)	Date	Time	Sample type: Soil	Sample type: Material	ASBESTOS 0.001% w/w	ASBESTOS								KEEP SAMPLE
1	FCP2	Ground Surface	7/06/2016	-		FCP		✓								YES
2	FCP2	0-0.1	7/06/2016	-	SP		✓									YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	9/06/2016	Suba	P. Buhay	08/06/16 @ 1640

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)	* Purge & Trap
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece (plastic bag)	✓	Test required	

SAMPLE RECEIPT ADVICE

SE153339

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13757-2 Warriewood**
Order Number	(Not specified)
Samples	2

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 8/6/2016
Report Due	Wed 15/6/2016
SGS Reference	**SE153339**

SUBMISSION DETAILS

This is to confirm that 2 samples were received on Wednesday 8/6/2016. Results are expected to be ready by Wednesday 15/6/2016. Please quote SGS reference SE153339 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	1 Material, 1 Soil	Type of documentation received	COC
Date documentation received	9/6/16@9:32am	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	16.3°C
Sample container provider	SGS	Turnaround time requested	Three Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE153339

CLIENT DETAILS

Client Geotechnique

Project 13757-2 Warriewood

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre ID in bulk materials	Gravimetric Determination of Asbestos in Soil
001	FCP2 Ground Surface	1	-
002	FCP2 0-0.1	-	9

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

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 147830

Client:
Geotechnique Pty Ltd
PO Box 880
Penrith
NSW 2751

Attention: A Barbhuyia

Sample log in details:

Your Reference:	**13757/2, Warriewood**		
No. of samples:	4 Soils		
Date samples received / completed instructions received	01/06/16	/	02/06/16

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.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	9/06/16	/	7/06/16
Date of Preliminary Report:	Not Issued		

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

ACCREDITED FOR TECHNICAL COMPETENCE

Organochlorine Pesticides in soil			
Our Reference:	UNITS	147830-1	147830-2
Your Reference	----------	Split S1	Split S2
	-		
Date Sampled	----------	30/05/2016	30/05/2016
Type of sample		Soil	Soil
Date extracted	-	03/06/2016	03/06/2016
Date analysed	-	04/06/2016	04/06/2016
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Surrogate TCMX	%	84	89

Acid Extractable metals in soil					
Our Reference:	UNITS	147830-1	147830-2	147830-3	147830-4
Your Reference	---------- -	Split S1	Split S2	Split S3	Split S4
Date Sampled	----------	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	03/06/2016	03/06/2016	03/06/2016	03/06/2016
Date analysed	-	03/06/2016	03/06/2016	03/06/2016	03/06/2016
Arsenic	mg/kg	<4	18	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	30	5	7
Copper	mg/kg	5	27	10	<1
Lead	mg/kg	21	24	15	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	6	2	4
Zinc	mg/kg	38	93	35	7

Moisture Our Reference: Your Reference	UNITS ----------	147830-1 Split S1	147830-2 Split S2	147830-3 Split S3	147830-4 Split S4
	-				
Date Sampled	----------	30/05/2016	30/05/2016	30/05/2016	30/05/2016
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	3/06/2016	3/06/2016	3/06/2016	3/06/2016
Date analysed	-	3/06/2016	3/06/2016	3/06/2016	3/06/2016
Moisture	%	13	15	9.6	25

Method ID	Methodology Summary
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			03/06/2016	[NT]	[NT]	LCS-8	03/06/2016
Date analysed	-			04/06/2016	[NT]	[NT]	LCS-8	04/06/2016
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	91%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	87%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	98%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	92%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	87%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	88%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	97%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	102%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	97%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	95%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	89	[NT]	[NT]	LCS-8	89%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			03/06/2016	[NT]	[NT]	LCS-8	03/06/2016
Date analysed	-			03/06/2016	[NT]	[NT]	LCS-8	03/06/2016
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	LCS-8	103%
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	LCS-8	103%
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	100%
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	103%
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	97%
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	LCS-8	94%
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	96%
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	98%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
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.

ENVIROLAB GROUP

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

coc received 2/6.

Job No: 147830. Coc.
Date Received: 1/6/2016 - 2/6/2016
Time Received: 17.00 - 13.40
Received by: PZ
Temp: Cool/Ambient 9.1
Cooling: Ice/Icepack
Security: Intact/Broken/None

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO:	ENVIROLAB SERVICES PTY LD 12 ASHLEY STREET CHATSWOOD NSW 2067	**Sampling By:** JH	**Job No:** 13757/2
			Project:
PH:	02 9910 6200 **FAX:** 02 9910 6201	**Project Manager:** AB	**Location:** Warriewood
ATTN:	MS AILEEN HIE		

Sampling details				Sample type		Results required by: Standard Turnaround Time								
Location	Depth (m)	Date	Time	Soil / Material	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB				KEEP SAMPLE
Split S1	1	30/05/2016	-	SG		✓			✓					YES
Split S2	2	30/05/2016	-	SG		✓			✓					YES
Split S3	3	30/05/2016	-	SG		✓								YES
Split S4	4	30/05/2016	-	SG		✓								YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	2/06/2016	P.Rey	R	2/6/2016 13.40
			(Sample)		1/6/2016 17.00

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece (plastic bag)	✓	Test required

* Purge & Trap

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Geotechnique Pty Ltd
Attention	A Barbhuyia

Sample Login Details	
Your Reference	13757/2, Warriewood
Envirolab Reference	**147830**
Date Sample Received	01/06/2016
Date Instructions Received	02/06/2016
Date Results Expected to be Reported	**09/06/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	4 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	9.1
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

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@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on 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
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*Organochlorine Pesticides in soil*	*Acid Extractable metals in soil*
Split S1	✓	✓
Split S2	✓	✓
Split S3		✓
Split S4		✓

APPENDIX C

ENVIRONMENTAL NOTES

IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by Geotechnique Pty Ltd, using guidelines prepared by the ASFE (Associated Soil and Foundation Engineers). The notes are offered to assist in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre-acquisition assessment on behalf of a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has changed, e.g. from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of e.g. a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible quantify the risks that unrecognised contamination poses to the ongoing proposed activity. Such risks may be financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment might not detect all contamination within a site. Contaminants could be present in areas that were not surveyed or sampled, or migrate to areas that did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant that may occur; only the most likely contaminants are screened.

AN ENVIRONMENTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

In the following events and in order to avoid cost problems, you should ask your consultant to assess any changes in the conclusion and recommendations made in the assessment:

- When the nature of the proposed development is changed e.g. if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered e.g. if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientists and opinions are drawn about the overall sub-surface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason site owners should retain the services of their consultants throughout the development stages of the project in order to identify variances, conduct additional tests that may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by Geotechnique Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data that may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs of specific individuals e.g. an assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another consulting civil engineer.

An assessment should not be used by other persons for any purpose or by the client for a different purpose. No individual, other than the client, should apply an assessment, even for its intended purpose, without first conferring with the consultant. No person should apply an assessment for any purpose other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FROM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists, based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these would not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. Should this occur, delays and disputes, or unanticipated costs may result.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion; therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.