GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

LOT 10 IN DP625084, 63-69 VICTORIA ROAD
LOTS 1 AND 2 IN SECTION 6 DP862, 45 DAY STREET
LOT 9 IN SECTION 6 DP862, 53 VICTORIA ROAD
LOT 10 IN SECTION 6 DP862, 46 THORNLEY STREET
LOTS 6, 7 AND 8 IN DP136422, 53 VICTORIA ROAD
DRUMMOYNE

UPDATED ADDITIONAL CONTAMINATION ASSESSMENT
AND
REMEDIAL ACTION PLAN

REPORT NO 13585/5-AA 14 AUGUST 2018

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GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

Job No: 13585/5
Our Ref: 13585/5-AA
14 August 2018

Bonus & Associates Architects Pty Ltd
Level 1, 597 Darling Street
ROZELLE NSW 2039
Email: geoff.bonus@bonusarch.com

Attention: Mr G Bonus

Dear Sir

re: **Proposed Commercial and Residential Development**
Lot 10 in DP625084, Lots 1, 2, 9 & 10 in Section 6 DP862 and
Lots 6, 7 & 8 in DP136422
Victoria Road, Day Street and Thornley Street, Drummoyne
Updated Additional Contamination Assessment & Remedial Action Plan

This report presents an additional contamination assessment (ACA) and an updated remedial action plan (RAP), which once implemented and validated will render the above site suitable for the proposed residential subdivision development.

Reference should be made to the Executive Summary of this report.

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

Yours faithfully
GEOTECHNIQUE PTY LTD

DANDA SAPKOTA
Associate

GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

EXECUTIVE SUMMARY

This report is the updated version of the report on additional contamination assessment (ACA) and remedial action plan (RAP) (Report No 13585/4-AA, dated 30 April 2018), submitted by Geotechnique Pty Ltd (Geotechnique), for a parcel of lands currently registered as Lot 10 in DP625084, Lots 1, 2, 9 and 10 in Section 6 DP862 and Lots 6, 7 and 8 in DP136422, located at 63 – 69 Victoria Road, 45 Day Street, 46 Thornley Street and 53 Victoria Road, Drummoyne (hereafter referred to as the site).

It is understood that the site is proposed for mixed commercial and residential with minimal opportunities for soil access.

This report has been prepared to satisfy the requirements of the council and to supplement the findings and to address the recommendations presented in the *Stage 2 Contamination Assessment* (Stage 2 CA) report (Our Ref: 13585/3-AA dated 23 September 2016) prepared by Geotechnique Pty Ltd (Geotechnique).

The objective of the ACA was to determine the contamination status of the site with the recovery of soil samples for chemical analysis from five additional borehole locations in the accessible open areas as recommended in Stage 2 CA report.

The objectives of the RAP were to ensure that all remediation works are carried out for the identified contamination during this ACA and the Stage 2 CA with due regard to the protection of the environment (terrestrial ecosystems), in a responsible manner, presenting no risk of harm to the public or to workers within the site, and comply with current regulations and guidelines, as well as provide details on the validation methodology and clean up levels/acceptance criteria that will ensure the suitability of the site for the proposed land use.

In order to achieve the objectives of the ACA and the RAP, the scope of work included review and summary of the previous contamination assessment applicable to the site, soil sampling and testing, development of an appropriate remedial strategy and devising details for validation, culminating in the preparation of a RAP.

Based on this ACA and the previous Stage 2 CA, it was indicated that soil within the site was impacted by asbestos-containing material (ACM) (>7mm fraction) and/or elevated concentrations of BaP at locations as indicated and tabulated on Drawing No 13585/4-AA2. Remediation is therefore deemed necessary.

The RAP has been prepared to guide contractors cleaning up/manage the contaminated soil/material within site (refer the Section 15 of this report).

Based on the advantages, disadvantages, and risks of each of the remediation options, it is our opinion that remediation of the BaP and/or asbestos impacted soils at and in the vicinity of HA5 as shown on Drawing No 13585/4-AA2, by excavation of the contaminated soil and disposal at a licensed landfill facility, is considered appropriate for the site. Based on the test results and the presence of ACM at location HA5, including Toxicity Characteristic Leaching Procedure (TCLP) the fill / soils at and in the vicinity of location, HA5 is classified as **"Special Waste – Asbestos Waste" for off-site disposal** as detailed Table K.

The waste must be disposed of at a facility that can lawfully accept the waste. All landfill delivery dockets shall be provided for inclusion in a final validation report.

Due to the elevated concentrations of BaP at locations, HA2 (0.5-0.8m) and HA4 (0.03-0.15m), exceeding the HIL B and BaP TEQ, delineation (by sampling and testing) at and in the vicinity these locations will be required to determine the extent of BaP contamination and waste classification of soil for off-site disposal. This could be carried out during the assessment of the footprint of the existing features such as brick house/building, shed, brick garage, concrete hardstands, etc. as shown as on Drawing No 13585/1-AA1.

The elevated concentrations of Zn and BaP at location HA1 (0-0.15m) and HA2 (1.0-1.3m) would not pose a risk of harm to human health under the proposed development, however it might present a risk of harm to the environment (terrestrial ecosystems), that due consideration must be taken if the soil in the vicinity of these locations is used for landscaping.

This RAP once implemented and validated the site (for identified contaminants), will render the site suitable for the proposed land use.

This RAP should be updated (if required) after the delineation (by sampling and testing) in the vicinity of identified locations of concern as mentioned above and/or assessment of soil in the footprints of the existing features.

The proposed remediation works are considered to be Category 2 (subject to agreement by the relevant council). A minimum of 30 days notice of the intention to proceed with remedial works must be given to the council.

The Environmental/Site Management Plan, Occupational Health & Safety Plan, and Contingency Plan to be implemented during the remediation work are outlined in Sections 16.0, 17.0 and 19.0 of the report.

Following completion of the remediation works, a suitable validation sampling and testing plan, as outlined in Section 18.0 of the report, must be implemented. On completion of validation, a report will be prepared to recommend the suitability of the site for the proposed residential with minimal opportunities for soil access.

It should be noted that SafeWork NSW(also known previously as WorkCover NSW) holds records on Dangerous Good Licence 35/009550 relating to the storage of dangerous goods at the Lots 6, 7, 8 DP136422 & Lot 9 Section 6 DP862 (Appendix B).

Assessment of soil in the vicinity of the previously installed underground storage tank (s), including the groundwater was beyond the scope of the additional assessment.

The following works are required to be implemented after completion of demolition and removal of the existing site features by a licensed contractor and prior to remediation works:

- Further assessment and clearance of asbestos contamination at and in the vicinity of the identified location of concern (HA5) in accordance with the procedure as detailed in Appendix C.
- Delineation (by sampling and testing) at the identified locations of concern (HA2 and HA4), to determine the extent of BaP contamination and to determine the waste classification.
- Assessment of contamination status of soil/material situated within the footprints of the existing site features (such as brick house/building, shed, brick garage, concrete hardstands, etc. as detailed in Drawing No 13585/1-AA1), will also be required after demolition/removal. The purpose of this is to ascertain the presence or otherwise of "suspect" materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos, ash particles, etc.) and fill, which were not encountered during fieldwork for this assessment. If any contaminants are identified, the site could be made suitable for the proposed use following successful remediation and validation.
- Assessment of soil in the vicinity of buried underground petroleum storage tank(s) (USTs) should be carried out after the removal of the USTs following the removal of aboveground features, including hardstand/building slabs. A non-intrusive geophysical survey shall be carried out to locate the USTs within the site after the demolition and removal of the above ground existing features. The assessment of soil in the vicinity of the identified USTs should be carried in accordance with NSW EPA Technical Notes: Investigation of Service Station Sites (NSW EPA 2014a). If contamination identified, remediation followed by validation must be carried out in order to render the site suitable for the proposed use. The remediation and validation strategy for the abandoned USTs and the impacted soil shall be carried in accordance with the procedure as detailed in Appendix D. The RAP should be updated (if required) and submitted to the council for approval based on the further assessment within the site.

  It should be noted that removal of tank(s) and associated features (if any) must be undertaken by duly qualified contractors in accordance with NSW legislation and guidance, relevant Australian Standards, and applicable work health and safety legislation (please: see Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW 2005).
- Assessment to determine the contamination status of groundwater should be carried out. Assessment of soil gas vapour may be required.

An Unexpected Finds Management Protocol (Section 19.1 and Appendix E) should be implemented if suspect materials or fill, (different to those encountered during the previous assessment) are encountered during future demolition / remediation work / earthworks or masked by overgrown grass or in between the sampling locations.

Reference should be made to Section 20.0 for details of the recommendations regarding any materials to be excavated and removed from the site and any fill to be imported to the site.

Reference should also be made to Section 21.0 of the report which sets out details of the limitations of the DCA and RAP.

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APPENDICES

1.0 INTRODUCTION

Further to our Stage 2 contamination assessment (Stage 2 CA), this report presents the results of an updated additional contamination assessment (ACA) and remedial action plan (RAP) for a parcel of land currently registered as Lot 10 in DP625084, Lots 1, 2, 9 and 10 in Section 6 DP862 and Lots 6, 7 and 8 in DP136422, located at Victoria Road, Day Street and Thornley Street, Drummoyne (the site), in the local government area of City of Canada Bay, as shown in Figure 1 below:

FIGURE 1

Map Data ©2015 Google

It is understood that the site is proposed for mixed commercial and residential uses.

This report has been prepared to satisfy the requirements of the council and to supplement the findings and to address the recommendations presented in the *Stage 2 Contamination Assessment* (Stage 2 CA) report (Our Ref: 13585/3-AA dated 23 September 2016) prepared by Geotechnique Pty Ltd (Geotechnique).

The objective of the ACA was to determine the contamination status of the site with the recovery of soil samples for chemical analysis from five additional borehole locations in the accessible open areas as recommended in Stage 2 CA report.

The objectives of the RAP were to ensure that all remediation works are carried out for the identified contamination during this ACA and the Stage 2 CA with due regard to the protection of the environment (terrestrial ecosystems), in a responsible manner, presenting no risk of harm to the public or to workers within the site and comply with current regulations and guidelines, as well as provide details on the validation methodology and clean up levels/acceptance criteria that will ensure the suitability of the site for the proposed land use.

2.0 SCOPE OF WORK

In order to achieve the objectives of preparing this report, the following scope of work was conducted:

- Review and summary of Reports 13585/3-AA and 13585/1-AA associated with the site.
- An inspection by an Environmental Scientist from Geotechnique to observe present site conditions and to identify site activities, site features and any visible or olfactory indicators of potential contamination that differ from those identified in Report (Our Ref: 13585/3-AA).
- Recovery of samples from the additional five boreholes for appropriate chemical analysis.
- Preparation and analysis of standard quality assurance (QA) and quality control (QC) samples.
- Assessment of the laboratory analytical results.
- Assessment of field and laboratory QA and QC.
- Assessment of the contamination status of the site.
- Developing an appropriate remedial strategy and devising details for validation, culminating in the preparation of the RAP.

3.0 SITE IDENTIFICATION AND OBSERVATION

The site is located at 63 – 69 Victoria Road, 45 Day Street, 46 Thornley Street and 53 Victoria Road, Drummoyne, in the local government area of Canada Bay and is registered as Lot 10 in DP625084, Lots 1, 2, 9 and 10 in Section 6 DP862 and Lots 6, 7, 8 in DP136422.

Reference may be made to the cadastral and deposited plans in Appendix A of the previous PCA report (Our Ref: 13585/1-AA dated 26 November 2015) for details.

Based on the site inspection in the accessible area, there were no obvious features (bowser, breather pipe, inlet valve and piping) associated with an underground storage tank or petroleum hydrocarbon staining on the ground surface of the site that would indicate the potential for contamination. There were no visible or olfactory indicators of potential contamination. However, WorkCover NSW holds records on Dangerous Good Licence 35/009550 relating to the storage of dangerous goods at the Lots 6, 7, 8 DP136422 & Lot 9 Section 6 DP862. It should be noted that no records were held by WorkCover NSW, pertaining to the Lot 10 in DP625084, Lots 1, 2, and 10 Section 6 DP862 as discussed later in Section 5 - Site History Information.

Based on the information received from the client, it was noted that there were no records available to regarding the removal and/or burial of the abandoned tank. It is assumed that the 2,500L tank installed in 1932 was removed and replaced with a 10,000L (actual capacity of 12,000) tank in 1982 at the time of construction of the NSW Ambulance Station. The 10,000L tank remains on site, decommissioned and sand filled. And communication with NSW Ambulance confirmed that are no tanks operational at the site.

Based on the information available for NSW Ambulance, there was no tank currently in operation at the Drummoyne site.

The site is bound by Victoria Road, Day Street and Thornley Street.

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

4.0 TOPOGRAPHY, GEOLOGY & HYDROGEOLOGY

The site gently slopes from towards south-east direction.

The Geological Map of Sydney (Herbert 1983) indicates the residual soils within the site to be underlain by Triassic Age Hawkesbury Sandstone of the Wianamatta Group, comprising of medium to coarse-grained quartz sandstone, minor shale and laminate lenses.

The Soil Landscape of Sydney (Chapman et al. 1983) indicates that the landscape at the site is likely to belong to the Lambert group, which is characterized by undulating to rolling rises and low hills on Hawkesbury Sandstone with local relief of 20m to 120m, and slopes usually of <20%. The subsurface soils are typically characterized by very high soil erosion hazard, rock outcrop, seasonally perched water tables, shallow, highly permeable soil and very low soil fertility.

The site is located roughly 300m up-gradient to the north of the Iron Cove Foreshore (river).

Reference should be made to Borehole Logs in Appendix A for descriptions of the soils encountered during sampling for this assessment. Based on information from all boreholes, the sub-surface profiles across the site are generalised as follows:

- Borehole locations HA6, HA7 and HA9 were covered by bitumen or concrete hardstand on the surface. The thickness of hardstand ranged from 5millimeters (mm) to 200mm.
- The following 3 types of fill were encountered;
  - Type 1 Fill: Clayey silt, grey-brown, with inclusion of gravel, encountered in borehole locations HA5 (0-0.4m), HA6 (0.1-0.25m) and HA8 (0-0.2m).
  - Type 2 Fill: Gravelly sand, medium to coarse-grained, brown-dark grey, well graded in borehole location HA7.
  - Type 3 Fill: Silty Clay, medium plasticity, brown, with gravel, encountered in borehole location HA9 (0.2-0.6m).

The thickness of the fill at borehole locations ranges from 0.2 to >0.6m.

It should be noted that the full thickness of fill could not determine in HA9 and HA6 due to the refusal to hand auger, respectively at depth 0.6m and 0.35m below the existing surface.

Reference may be made to Drawing No 13585/4-AA1 for details of the above-mentioned borehole locations.

Field observations by the Environmental Scientist indicated that there were no detectable odour and no obvious staining/discolouration of the soil, and fibro-cement pieces on the bare surface of the site and at the sampling locations, with the exception of a fibro-cement piece observed on the surface of the sampled location HA5.

Groundwater or seepage was not encountered during sampling to a depth of about 0.6m below the existing ground level (EGL) and during the short time, the boreholes remained open. It should be noted that fluctuations in the level of groundwater might occur due to variations in rainfall and/or other factors not evident during the investigation.

5.0 SITE HISTORY INFORMATION

Geotechnique carried out a review of site history information as part of the PCA (Ref 13585/1-AA, dated 26 November 2015). The review included historical aerial photographs, records of NSW Department of Lands (DOL), Planning Certificates under Section 149 (2) of the Environmental Planning and Assessment Act 1979, council records, NSW Office of Environment and Heritage (OEH) records of Environment Protection Authority (EPA) Notices for Contaminated Land, search for licences, applications and notices under the Protection of Environment Operations (POEO) register, as well as NSW WorkCover records. For details, reference should be made to Report 13585/1-AA.

The aerial photographs reveal that the site might have been used for residential and commercial / industrial purposes from 1961 to 2015.

Land and Property Information NSW records indicate various current and past owners (either private or commercial) of the site. Reference may be made to Section 4.2 in previous PCA report (Our Ref: 13585/1-AA) for details of past owners and leases.

The Planning Certificates under Section 149 of the Environmental Planning and Assessment Act 1979 for the site, issued by City of Canada Bay Council, indicated that:

- Lot 10 DP625084 and Lots 6, 7 and 8 DP136422 are zoned B4 Mixed Use.
- Lots 1, 2, 9 & 10 Section 6 DP862 is zoned R2 Low Density Residential.
- No matters arising under the *Contaminated Land Management Act 1997*.

No significant contamination issue found regarding the site during the council records search.

A search of the EPA records on 3 November 2015 revealed no notices issued for the site.

A search of the licences, applications and notices under the POEO Public Register on 3 November 2015 (refer to Appendix C of this report) found no records for the subject site.

WorkCover NSW holds records on Dangerous Good Licence 35/009550 relating to the storage of dangerous goods at Lots 6, 7, 8 DP136422 & Lot 9 Section 6 DP862 (Appendix B).

Based on the records, it is assumed that the 2,500L tank installed in 1932 was removed and replaced with a 12,000L tank in 1982. It was also noted that the UST (10, 000L) was certified as abandoned on 6 September 1999, and was backfilled via sand fill method in accordance with AS1940. Furthermore, the dispensing pump has been removed and the electrical supply disconnected. It should, however, be noted that the WorkCover licence records indicated the capacity of the UST as 12,000L (Please refer to Appendix B for details). It is assumed that it is the same UST with a nominal capacity of 10,000L (with an actual capacity of 12000L).

There was a previous UST installed on the site in 1938 with a volume of 500 gallons for the storage of mineral spirits. The ambulance station was rebuilt in 1982 and nothing on the file demonstrates what happened to the 500 gallon UST.

The Stage 2 CA (Report No 13585/3-AA) carried out 23 September 2016, recommended for further assessment and preparation of a remedial action plan in order to remediate the identified area with contaminated soil followed by validation to render the site suitable for the proposed use. It should also be noted that assessment of footprints of the existing site features with sampling and testing should be carried out after demolition and / or removal in order to characterise the entire site. In the event of contamination, detailed assessment, remediation and validation will be required, updating the RAP (if required).

6.0 CONCEPTUAL MODEL / CONTAMINANTS OF CONCERN (COCS)

As defined in Schedule B2 of NEPM 1999 (April 2013), "conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments and provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future".

The CSM is utilised for informing regarding the investigation and remediation/management of potential and known contaminants of concern.

The initial CSM developed from the results of the PCA, DCA is updated to identify data gaps and inform a decision for assessment of soil, followed by remediation and validation.

Based on the previous assessments, the potential contaminants of concern (COCs) considered within the footprints of the existing features, are as follows:

Table 1 Potential Areas of Environmental Concern & Associated Contaminants

Potential AEC	Rational / Details	Potential Contaminants [1]
Buildings, metal roofs 63 - 69 Victoria Road, 53 Victoria Road, 45 Day Street, and 46 Thornley Street.	➢ Due to the age of the buildings, concealed pipes (water, sewer or stormwater), walls, floor tiles etc., in the buildings might contain asbestos. ➢ Degradation of metal features. ➢ Possible pest control activities in the vicinity of the buildings.	➢ Asbestos Containing Material (ACM) ➢ Asbestos Fibres ➢ Heavy Metals, including, arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni) and zinc (Zn). ➢ Organochlorine Pesticides (OCP)
Fibro-office (Council Records) at 63 - 69 Victoria Road.	➢ Building materials might contain asbestos.	➢ ACM ➢ Asbestos Fibres
Garage/workshop at 45 Day Street.	➢ Building materials might contain asbestos. ➢ The potential for solvents, degreasers, motor oils, paint and/or metal contamination.	➢ Asbestos ➢ Heavy Metals ➢ Volatile Organic Compound (VOC) ➢ Total Petroleum Hydrocarbons (TPH) ➢ Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX) ➢ Polycyclic Aromatic Hydrocarbons (PAH) ➢ Phenols

Potential AEC	Rational / Details	Potential Contaminants [1]
Underground fuel storage tank at 53 Victoria Road.	➢ There is potential for soil contamination due to the presence of underground tank(s) in the past. ➢ If the tanks have leaked where perched water intercepts the contamination area, it might be possible that the groundwater could be contaminated.	➢ Heavy Metals ➢ TPH ➢ BTEX ➢ PAH ➢ VOC
Metal features, including metal, shed.	➢ Degradation of metals.	➢ Heavy Metals

[1] The suite of potential contaminants identified will be reviewed subject to the findings of the excavated materials and added to if considered appropriate.

The elevated concentrations of Benzo(a)Pyrene and zinc (Zn) were considered as contaminants of concern during the Stage 2 CA (with limited sampling and testing). It is therefore, additional sampling and testing in the accessible open areas, in compliance with the NSW EPA design Guidelines (NSW EP1995) was carried out as part of this ACA.

Assessment of soil beneath the existing site features was beyond the scope of this assessment due to access limitation.

It was noted that the site contains an abandoned 10,000L (nominal capacity) underground storage tank (UST) for fuel storage (unleaded petrol) which was backfilled via sand fill method in accordance with AS1940. It was also noted that the UST was installed in 1982, and certified as abandoned on 6 September 1999.

There was a previous UST installed on the site in 1938 with a volume of 500 gallons for the storage of mineral spirits. The ambulance station was rebuilt in 1982 and nothing on the file demonstrates what happened to the 500 gallon UST.

As the number of underground tank(s) remaining within the site is not known at this stage. A geophysical survey should be carried out for locating the underground storage tank(s) buried within the site. The information gained can be used for selecting optimal locations for boreholes and test pits for soil sampling after demolition and removal of the aboveground site features, in order to determine the contamination status of the soil in the vicinity of the buried tank(s).

6.1 Potentially Contaminated Media

Potentially contaminated media present at the site may include:

- Fill material; and
- Natural Soils
- Groundwater /Surface water

The potential exists for fill material and natural soils to have been impacted by the former activities conducted within each of the buildings and how each of the buildings was constructed (i.e. asbestos and OCPs).

Based on the potential mobility of contaminants and associated potential leachability through the soil profile, vertical migration of contaminants from the surface soils/fill into the underlying natural soils/shale bedrock might have occurred. As a result, the natural soils and underlying shale bedrock are also considered to be potentially contaminated media.

Groundwater or perched water was not encountered during sampling to a maximum depth of about 0.5m below the EGL. Given the relatively permeable nature of the natural residual soil beneath the site, it might be possible that the groundwater could be contaminated.

Surface water is not identified as a potentially contaminated medium based on the absence of any permanent waterbody transecting the site; however, sensitive surface waterbodies (Sisters Bay/Iron Cove/ Parramatta River) are located in the vicinity of the site (less than 400m to the south-east of the site).

6.2 Potential for Migration

Contaminants generally migrate from the site via a combination of windblown dust, rainwater infiltration, groundwater migration and surface water run-off. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics).
- The extent of the contaminants (isolated or widespread).
- The locations of the contaminants (surface soils or at depth).
- The site topography, geology, hydrology and hydrogeology.

Off-site impacts of contaminants in soil are generally governed by the transport media available and likely receptors. The most common transport medium is water, whilst receptors include initially uncontaminated soils, groundwater, surface waterbodies, humans, flora and fauna.

The potential contaminants identified as the information obtained, site inspection and field sampling were generally in a solid form (e.g. heavy metals, PAH, asbestos).

The ground surface within the site was in grass and hardstands covered. The potential for migration of contaminants via wind-blown dust is considered low. The potential for migration of contamination via surface run-off is also expected to be minor. Some migration of contaminants via surface water might still occur in the event of heavy rain.

Migration of soil contaminants to the deeper soils or groundwater regime would generally be via leaching of contaminants from the surface soil or fill, facilitated by infiltration of surface water. Given that the naturally occurring soils beneath the site are relatively permeable (refer to Section 6.0 for the regional geology information) the potential for recent and ongoing migration of contaminants from the site to the groundwater table below might have impacted. It is, therefore, groundwater assessment will be required to determine the contamination status of the groundwater.

The human receptors at the site and in the immediate vicinity, under current site conditions, are considered to include, residents, visitors and workers during the excavation/drilling who might come into contact with potentially contaminated media within the site.

The ecological receptors in the vicinity, under current site conditions, are considered to include, Brett Park, Bridge Street Wharf, Sisters Bay/Parramatta River.

7.0 DATA QUALITY OBJECTIVES

Data quality objectives (DQO) are qualitative and quantitative statements that specify the quality of the data required for the contamination assessment. DQO must ensure that the data obtained is sufficient to characterise the contamination on a site, and enable appropriate assessment of health and environmental risks for the current or proposed use. The DQO were developed for this contamination assessment in accordance with the Schedule B2 (Appendix B) of the NEPM 1999 (April 2013).

At the investigation level, DQOs are qualitative and quantitative statements, developed in the first six of the seven steps of the DQO process that define the purpose of the site assessment to be undertaken and the type, quantity and quality of data needed to inform decisions relating to the assessment of site contamination. In the seventh step of the DQO process, the sampling analysis and quality plan (SAQP) is developed to generate data to meet the DQOs.

The process includes the development of the following:

• a statement of the DQOs
• the SAQP to achieve the DQOs
• procedures to follow if the data does not meet the specified DQOs.

The DQO process adopted is detailed below.

7.1 State the Problem

The client is proposing for mixed commercial and residential with minimal opportunities for soil access. Previous PCA and additional assessment undertaken by Geotechnique indicated that the soil may be contaminated from a number of possible sources and activities as mentioned in Table 1 (Section 6 of this report).

The 'problem' as it stands is that previous and existing land uses may have given rise to potential soil contamination, which could impact on the proposed development.

An investigation is to be undertaken in order to provide data on the status of the soil on site. The analytical data should then enable recommendations to be made with regard to any future remedial works.

The 'problem' to be addressed is whether the site can be declared environmentally suitable for the proposed development, following completion of the demolition and remedial works.

The following key professional personnel were involved in the contamination assessment:

Danda Sapkota	Associate
Justin Hofmann	Environmental Scientist

7.2 Identify the Decisions

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

- Are there any unacceptable odours emanating from the site?
- Are there any unacceptable aesthetic issues within the site?
- Are there any unacceptable risks to site occupants or the environment under the proposed land use?

- Are there any background soil contaminant levels within the site that pose a risk to future site occupants or the environment under the proposed development?
- Are there any human health risks posed by potential chemical mixtures within the site?
- Is there any evidence of or potential for, migration of contaminants from the site?
- Is the site currently suitable for the proposed land use?
- Is further investigation required to adequately address the abovementioned decisions?
- Is further investigation required to delineate the extent of contamination/locations of concern identified?
- Does the site require remediation or management to ensure suitability for the proposed land use?

7.3 Identify Inputs to the Decisions

The inputs into the decision process are as follows:

- Site conditions and observation details (presented in Section 3.0).
- An additional sampling soil sampling to target specific sources of potential contamination in the open accessible area.
- Soil profile information obtained through the sampling phase (additional sampling).
- Develop conceptual site model (presented in Section 6.0).
- Laboratory test data on analysed samples.
- Assessment of test results against applicable soil Investigation levels and screening levels in the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013) (Section 11.0).

7.4 Define the Study Boundaries

The study boundary for this assessment is defined by boundaries of the site including the revised locations of concern as shown on Drawing No 13585/4-AA3.

The vertical boundary will be the depth within the soil profile to which contamination might have potentially migrated.

7.5 Develop a Decision Rule

The information obtained through this assessment will be used to characterise the subject 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:

- The assessment criteria are the NSW EPA produced and/or endorsed criteria, as specified in Section 11.0 of this report. For asbestos assessment, the site must be free of asbestos-cement pieces and no asbestos fibre detected in the soils.
- The subject site will be deemed contaminated or containing contamination “hot spots” if any of the above criteria are unfulfilled or if any asbestos-cement pieces/sheets are noted and/or asbestos fibres are detected in the samples analysed.
- Further investigation, remediation and/or management will be recommended if the site is found to be contaminated or containing contamination “hot spots”.

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 should be less than laboratory limits of reporting or should not be detected significantly.
- The recovery of spike concentrations in the trip spike sample is sufficient so as not to affect the reported concentrations of the soil samples when the same recovery is applied (BTEX only).
- The differences between the reported concentrations of the analytes in the field duplicate and the corresponding original samples are within accepted limits (refer to Section 9.5).
- The differences between the reported concentrations of the analytes in the inter-laboratory duplicate (split) 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 National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013) "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*".

7.6 Specify Limits on Decision Errors

The limits on decision errors for this assessment are as follows:

- Selection of sampling patterns complies with those recommended in the NSW EPA sampling design guidelines, which have risk probabilities already incorporated. Sample numbers and sampling plans are therefore considered to be adequate for site characterisation.
- The analyte selection is based on the previous site investigations and soil profiles. The possibility of any other potential contaminants that would be detected through field observation (odours, staining, and colouring) during sampling may need to be included. The potential for contaminants other than those analysed is considered remote.
- The assessment criteria adopted from the guidelines stated in Section 11.0 have risk probabilities already incorporated.
- The acceptable limits for field and inter-laboratory duplicate 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 Schedule B3 of National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 (April 2013).

7.7 Optimise the Design for Obtaining Data

The following measures were undertaken to ensure accurate data collection:

- The procedures adopted for the 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 the 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 the previous site investigations and soil profiles) and refined on the basis of field observations (both surface and sub-surface) during the sampling phase. All potential contaminants have been covered.
- Only laboratories accredited by NATA for the analyses undertaken were used for this assessment. The laboratory performance is assessed through a review of statistics calculated for QA samples such as blanks, spikes, duplicates and surrogates.
- The field QA/QC protocols adopted are outlined in Section 10.0 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.

7.8 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.

An assessment of the data quality indicators is presented in Section 9.0 and Section 10.0 of this report for field procedures (soil sampling phase) and for laboratory procedures (analytical phase) respectively.

8.0 ADDITIONAL SAMPLING & ANALYSIS PLAN AND SAMPLING METHODOLOGY

Additional sampling and analyses for this assessment were carried out, in accordance with NSW EPA sampling Guidelines (NSW EPA 1995) in open accessible area, to obtain a reasonable assessment of the following:

1. Nature and location of any soil contaminant(s) within the site.
2. The risk(s) that the contaminant(s) (if present) poses to human health and/or the environment under the conditions of the proposed land use.

The risk of harm to human health and the environment was determined through comparison of test results with EPA produced or endorsed criteria available at the time, as discussed in Section 11.0 of this report.

Additional sampling for potential contaminants in addition to the previously sampled locations of concern was carried out on 3rd April 2018 by our Environmental Scientist from Geotechnique.

Assessment of footprints of the site features was beyond the scope of this assessment at this stage. Reference may be made to Drawing No 13585/4-AA1 for the sampling borehole locations.

Prior to sampling, the borehole locations were scanned by a service locator in order to avoid any underground services.

The sampling procedures adopted were as follows:

- The sample location was drilled to a predetermined depth using a manually operated hand auger. Thereafter, the sample was recovered from the stainless steel auger using a stainless steel trowel.
- The stainless steel auger / trowel was decontaminated prior to use, in order to prevent cross-contamination (refer to Section 9.2 for details of the procedures for decontamination of the trowel).
- To minimise the potential loss of VOC, the laboratory soil sample was immediately transferred, using a stainless steel trowel, 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 and analysis was transferred into a small 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 Teflon top lid. The fully filled jar was placed in a chilled container.

A rinsate water sample was collected and placed in bottles supplied by the laboratory. The fully filled bottles were labelled and placed in a chilled container.

At the completion of field sampling, the chilled container and the samples in a plastic bag for asbestos analysis were transported to our Penrith office. All the jars were then transferred to a refrigerator where the temperature was maintained below 4°C.

The day following fieldwork, the primary samples in chilled containers with trip spike samples were forwarded under Chain of Custody (COC) conditions to the primary testing laboratory Envirolab Services Pty Ltd (Envirolab). Inter-laboratory duplicate (split) samples were forwarded to the secondary testing laboratory of [SGS Environmental Services (SGS)]. Both Envirolab and SGS are NATA accredited.

On receipt of the samples, the laboratories returned the Sample Receipt Advice, verifying the integrity of all the samples received.

Based on site observation, the soil profiles encountered and the potential contaminants, as indicated in the in Section 6.0, the following laboratory analysis plan was implemented:

- Five (5) samples were analysed for a range of metals [arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni) and zinc Zn)], TRH, BTEX, PAH, OCP, PCB, Phenols cyanide and asbestos.
- Three samples were screened for VOC.
- Three samples were selected for pH and CEC.
- One rinsate sample was analysed for metals, TRH/BTEX and PAH.
- One Trips Spike sample was analysed for BTEX.
- Five (5) samples were selected for analysis of asbestos for screening purposes.

9.0 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

9.1 Sampling Personnel

Geotechnique undertook all the sampling associated with this assessment. An Environmental Scientist (Justin Hofmann) from Geotechnique, trained in Geotechnique procedures for sampling and logging, nominated sample locations, drilled using a manually operated hand auger, logged the soil profile encountered, recovered soil samples, prepared QA/QC samples and packaged the samples. Justin has undergone supervised training in Geotechnique procedures for sampling and logging.

9.2 Decontamination Procedures

Soil samples were transferred from sample locations to the laboratory supplied glass jar using a decontaminated stainless steel trowel. The trowel was used to divide the soil sample into two portions to prepare duplicate and split samples. Decontamination of the trowel involved the following:

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

A sample of the final rinsate water sample was prepared at the completion of sampling.

9.3 Rinsate Sample

One rinsate water sample (Rinsate R1) was prepared at the end of fieldwork in order to identify possible cross-contamination between the sampling locations.

The rinsate water sample R1 was analysed for Metals, TRH/BTEX and PAH. The test results for the rinsate water samples are summarised in Table A. A copy of the laboratory analytical report is included in Appendix C of this report.

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

9.4 Trip Spike Sample

Trip spike sample was 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 fieldwork, the trip spike sample was kept in the chilled container with soil samples recovered from the site. The trip spike sample was 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 fieldwork, transportation, sample extraction or testing.

Trip spike sample (TS1) was forwarded to the primary analytical laboratory with the samples collected from the data gap area 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.

As indicated in Table B, the results show a good recovery of the spike concentrations, ranging between 78% and 110% were within the acceptable range (70%-130%).

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 Sample

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

- A larger than normal quantity of soil was recovered from the sample location selected for duplication;
- The sample was divided into two portions, using the decontaminated trowel;
- One portion of the sample 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 was stored in the same way and labelled as the original sample.

Duplicate samples were prepared on the basis sample numbers recovered during the fieldwork for metal and analysis. The duplicate sample frequency was computed using the total number of samples analysed as part of this assessment.

The duplicate frequency adopted complies with Schedule B3 (NEPM 1999, April 2013) on Laboratory Analysis of Potentially Contaminated Soils of the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 (April 2013), which recommends a duplicate frequency of at least 5%. No duplicate samples for asbestos were prepared as it was not applicable for computing the RPD.

The laboratory test results are summarised in Table C. A copy of the laboratory analytical report is included in Appendix C of this report.

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

As shown in Table C, the comparisons between the duplicate and corresponding original sample indicated generally acceptable RPD, with the exception of RPDs ranging from 33% to 91% for some metals and organics, which were in excess of 30%, mainly due to the lower concentration of analytes and or heterogeneity of the samples (fill) analysed.

Based on the above, the variations are not considered critical. Based on the overall duplicate sample numbers and comparisons, it is concluded that the test results provided by the primary laboratory SGS are of adequate accuracy and reliability for this assessment.

9.6 Inter-laboratory Duplicate (Split) Sample

The inter-laboratory duplicate (split) samples provide a check on the analytical performance of the primary laboratory. The split samples were prepared in the same manner as the duplicate sample. Reference should be made to Section 8.5. The split samples were forwarded to a secondary laboratory (Envirolab) for analysis.

Split samples were prepared on the basis of sample numbers recovered during fieldwork. The split sample frequency was computed using the total number of samples analysed as part of this assessment.

The split sample frequency adopted complies with the Schedule B3 of the NEPM 1999 (April 2013), which recommends a frequency of 5%.

The results are summarised in Table D. A copy of the laboratory analytical report and certificate of analysis is included in Appendix C of this report.

Based on Schedule B3 of the NEPM 1999 (April 2013) 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, higher variations can be expected for organic analyses compared to inorganic analyses and for samples with low analyte concentrations or non-homogeneous samples.

As indicated in Table D, the comparisons between the split and corresponding original sample indicated generally acceptable RPD, with the exception of higher RPDs of 72% and 43% for Cr and Ni, mainly due to lower concentrations of the metals detected, which were not considered critical.

Based on the overall split sample numbers and comparisons, it is concluded that the test results provided by the primary laboratory can be relied upon for this assessment.

10.0 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Geotechnique uses only laboratories accredited by the NATA for chemical analyses. The laboratories 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 laboratories 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.

The soil samples were analysed within the allowable holding times, detailed in Schedule B3 of the NEPM 1999 (April 2013). Within the allowable holding times for water detailed in Standard Methods for the Examination of Water and Wastewater (APHA), the rinsate sample was analysed.

The test methods and laboratory limit of reporting (LOR) / practical quantitation limits (PQL) adopted by the laboratories are indicated with the laboratory analytical reports/certificate of analysis. A copy of the laboratory analytical reports/certificate of analysis is included in Appendix C of this report.

As part of the analytical run for the project, the laboratories included laboratory blanks, duplicate samples, laboratory control samples, matrix spikes and surrogate spikes.

The QA/QC procedures adopted by the laboratories and the results have been checked and considered to generally comply with Schedule B3 of the NEPM 1999 (April 2013).

Overall, the QA/QC adopted by SGS and Envirolab indicated the analytical data to fall within acceptable levels of accuracy and precision. The analytical data provided is therefore considered to be reliable and usable for this assessment.

11.0 ASSESSMENT CRITERIA

Investigation levels and screening levels developed in National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013) and the *Guidelines for the NSW Site Auditor Scheme* (NSW EPA 2017) were used in this assessment, 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.

  It is understood that the site is proposed for residential and commercial use with minimal access to soils. Therefore, with regard to human health, analytical results will be assessed against risk-based HIL for *residential with minimal opportunities for soil access* (HIL B).

- Health Screening Levels (HSL) for TPH 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 the surface to >4 m.

  For this assessment, the analytical result was assessed against the available HSL for *high-density residential soil* (HSL B).

- 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 *urban residential soil.*

- Ecological Investigation Levels (EIL), a specific type of Soil Quality Guidelines (SQG) for selected metals are 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. The 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). Where available, EIL are calculated directly by using the EIL calculator developed by CSIRO for NEPC.

The site will be deemed not significantly impacted by past and present usage if the following criteria are fulfilled:

- the 95% upper confidence limit (UCL) of the arithmetic mean of the data set is less than the assessment criteria
- the standard deviation of the data set is less than 50% of the assessment criteria
- no individual sample result is greater than 250% of the assessment criteria

The individual concentrations of analytes with the majority of concentrations less than the LOR were assessed against the relevant criteria.

Where applicable, this statistical approach was adopted for assessment of the laboratory data.

For asbestos assessment, the site must be free of asbestos pieces and no asbestos fibre detected in the soils.

The site 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 site is found to be contaminated or contain contamination "hot spots".

12.0 LABORATORY TEST RESULTS, ASSESSMENT & DISCUSSION

Reference may be made to Appendix C for the actual laboratory analytical reports from SGS. The laboratory test results for the soil samples analysed are presented in Tables E to I. A discussion of the test results is presented in the following sub-sections.

12.1 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni & Zn), CEC& pH

As presented in Table E, CEC and pH values range from 5.3 cmol/kg to 20 cmol/kg and 6.6 to 8.5 respectively. Test results of the CEC and pH were adopted to calculate EIL where applicable.

As indicated in Table E, the 95% UCL of the mean concentrations for metals were well below the relevant HIL B, HSL B, EIL. The standard deviation of the data set was below 50% of the assessment criteria adopted.

The three individual sample results for Zn at locations, HA1 and HA2 were less than 250% of the assessment criteria and HIL B but above the adopted EIL, which might present a risk of harm to the environment (terrestrial ecosystems). It is, therefore, that due consideration should be taken if the soil in the vicinity of these locations is used for landscaping.

12.2 TRH and BTEX

As indicated in Table F, the concentrations of F1 (TPH C6-C10 less BTEX), F2 (TPH>C10-C16 less Naphthalene and TPH>C10-C16), F3 (TPH >C16-C34), F4 (TPH >C34-C40) and BTEX were below the relevant available HSL B and/or ESL adopted.

12.3 Polycyclic Aromatic Hydrocarbons (PAH)

The PAH test results for discrete samples are presented in Table G and as shown, the test results indicated that the 95% UCL of the mean concentrations for Benzo (a) Pyrene (BaP) (TEQ), BaP were well above the relevant HIL B, HSL B, EIL and/or ESL. The standard deviation of the data set was more than 50% of the assessment criteria. The individual sample results, at locations, HA2 (0.5m-0.8m and 1.0m-1.3m), HA4 (0.03-0.15m) and HA (5 0m-0.15m) were greater than 250% of the assessment criteria.

The highlighted BaP TEQ and BaP concentrations in samples at location HA2, HA4 and HA5 would present a risk of harm to human health and the environment under the proposed land use.

The highlighted BaP concentrations in samples HA1 (0-0.15) and HA2 (1.0-1.3) were below the 250% of the assessment criterion but above the ESL. This might present a risk of harm to the environment and due consideration must be taken while using the soil in the vicinity of these locations for landscaping.

12.4 Organochlorine Pesticides (OCP)

As shown in Table H, the concentrations of OCP were less than the laboratory LOR and well below the relevant HIL B. Concentrations of DDT were also below the EIL.

12.5 Polychlorinated Biphenyls (PCB)

As presented in Table H, the concentrations of PCB were less than the HIL B.

12.6 Cyanides

As shown in Table H, the concentrations of Cyanides were well below the HIL B.

12.7 Phenols

As shown in Table H, the concentrations of Phenols were below the HIL B.

12.8 VOC

As indicated in Table I1 to I4, no VOC was detected in the analysed samples.

12.9 Asbestos

The asbestos test results for the additional sampling are shown in Table J and as indicated, no asbestos exceeding the limits of reporting was detected in all the additional samples analysed. The FCP recovered near the HA5 contained asbestos and is considered as asbestos-containing material (ACM).

13.0 SITE CHARACTERISATION

The results are discussed in the following sections in relation to the identified decisions developed as part of the DQO process (Section 7).

- **Odours:** No odours were observed at the site surface or within fill or natural soils at the site.
- **Aesthetics:** No unacceptable aesthetic issues were identified at the site surface or within fill soils at the site.
- Human Health and Ecological **Risk assessment:** Maximum or 95% percentile concentrations of site analytes were assessed by a human health investigation levels and ecological investigation levels for the proposed land use as specified in NEPM (1999, April 2013), which have risk probabilities already incorporated.
- **Potential Risks to Future Onsite Receptors:** As presented in the summary tables (Tables E to J) and discussed in Section 12.0, the majority of laboratory data and/or datasets for additional assessment satisfied the criteria for stating that the analytes selected are either not present (i.e. concentrations less than laboratory PQL), or present in the sampled soils at concentrations that do not pose a risk of hazard to human health or the environment, under residential and commercial land use with the exception of the locations with elevated concentrations of BaP, zinc and/or asbestos contamination as indicated on the Drawing No 13585/4-AA2.

- **Chemical Mixtures:** There were no potential chemical mixtures observed during the site inspection that may pose a contamination issue at the site.
- **Is remediation or management required?:** Based on the results reported above, and the above characterisation and responses to decisions developed as part of the project DQOs, the location of elevated levels of Bap, Zinc and presence the ACM were identified which were determined as requiring remediation works.

14.0 UPDATED CONCEPTUAL SITE MODEL

Based on the current ACA and the previous Stage 2 CA in the open accessible areas of the site, the following Contaminants of Concern (Drawing No 13585/3-AA2) were identified at elevated levels and selected as requiring remediation works:

- Metal (Zinc)
- Benzo(a)Pyrene
- Bonded ACM

It should be noted that the assessment of soil beneath the existing site features, including in the vicinity of the abandoned underground tank(s) (USTs) was beyond the scope of the assessment.

14.1 Contaminated Media

Based on the assessment conducted within the site, the primary contaminated media in the open access area the fill material and may extend to the fill beneath the existing site features and natural soil and /or groundwater.

14.2. Potential for Migration

Previous assessments were carried out for the soil up to about 0.5m below the ground level due to access limitation. Based on this assessment, in the absence of test results for natural soil and groundwater quality, it is inconclusive if the whether the natural soil and/or groundwater have been impacted by the contaminants.

As discussed earlier in Section 6 of this report, the naturally occurring soils beneath the site are relatively permeable. There is potential for migration of contaminants from the site to the groundwater table within the site or potential offsite migration. It is therefore, groundwater assessment will be required to determine the contamination status of the groundwater.

Currently, the site is covered mostly covered by hardstand and the exposure of contaminants to human receptors is considered minimal with the exception of emergency workers during the excavation and drilling for services or repairs. The proposed development, involving the excavation of soil will result in exposing the soil to residents (within the site or neighbouring properties), visitors and/or workers during the excavation/drilling who might come into contact with potentially contaminated media within the site.

The ecological receptors in the vicinity, under current site conditions, as mentioned earlier considered including Brett Park, Bridge Street Wharf, Sisters Bay/Parramatta River.

It should be noted that the site contained various site features as indicated in Drawing No 13585/1-AA1. Due to the access limitation, soil sampling beneath the existing features could not be carried out as part of this assessment. Assessment of soil beneath the site features and detailed assessment to determine the extent of asbestos and Bap contamination must be carried out after their demolition and removal.

The site history indicated that WorkCover NSW holds records on Dangerous Good Licence 35/009550 relating to the storage of dangerous goods at Lots 6, 7, 8 DP136422 & Lot 9 Section 6 DP862 (Appendix B). It was noted that an abandoned 10,000L underground storage tank (UST) for fuel storage (unleaded petrol) was backfilled via sand fill method in accordance with AS1940 There was a previous UST installed on the site in 1938 with a volume of 500 gallons for the storage of mineral spirits. The ambulance station was rebuilt in 1982 and nothing on the file demonstrates what happened to the 500 gallon UST.

It is strongly recommended that an intrusive geophysical survey is carried out to locate the buried underground storage tank(s) and assessment of soil in the vicinity of the tank(s) must be carried out to determine the contamination status of the soil surrounding the buried USTs (identified during the geophysical survey), must be carried out in accordance with the *NSW EPA* Technical Notes for Investigation of Service Station Sites (NSW 2014a) and the remediation strategy as indicated in Appendix D.

15.0 REMEDIAL ACTION PLAN

Based on this ACA assessment and the previous Stage 2 CA, it was determined that soil at isolated locations within the site was contaminated, BaP and/or asbestos (ACM in >7mm) fraction as indicated on the Drawing No 135585/4-AA2. It was also noted that the site contains an abandoned underground storage tank (UST) for fuel storage (unleaded petrol) was backfilled via sand fill method in accordance with AS1940 and there was no information regarding the one 500 gallon UST, whether it was abandoned onsite or removed from the site. Therefore, remediation is required for the identified contaminants and expected potential contaminants beneath the existing site features.

The three individual sample results for Zn at locations and one individual sample for BaP at locations, HA1 and HA2 were less than 250% of the assessment criteria and HIL B but above the adopted EIL, which might present a risk of harm to the environment (terrestrial ecosystems). It is therefore, that due consideration should be taken if the soil in the vicinity of these locations is used for landscaping purpose.

Please refer to Appendix D for the details of remediation and validation strategy of the abandoned UST(s) within the site and assessment of the impacted soil associated with the presence of USTs:

15.1 Site Remediation Policy

Under the *Protection of the Environment Operations Act* (PEO Act) and in accordance with the NSW EPA *Guidelines for the NSW Site Auditor Scheme (*NSW EPA 2017) and NEPM 1999, the preferred hierarchy of options for site remediation and / or management is set out in Section 6 (16) of the NEPM 1999, which is summarised as follows, in order of preference:

- On-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or

If the above options are not practicable:

- Consolidation and isolation of the soil on-site by containment within a properly designed barrier; and

- Removal of contaminated material to an approved site or facility, followed where necessary, by replacement with the appropriate material;

Or:

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

When deciding which option to choose, the sustainability (environmental, economic and social) of each option should be considered, in terms of achieving an appropriate balance between the benefits and effects of undertaking the option.

The criteria for disposal of contaminated soil are generally governed by the "Waste Classification Guidelines Part 1: Classifying Waste", the NSW EPA 2014b. This guideline outlines a clear, step-by-step process for classifying waste. There are six waste classes to be used:

- Specific Waste, including clinical and related waste, asbestos waste, as well as waste tyres
- Liquid Waste
- Hazardous Waste
- Restricted Solid Waste
- General Solid Waste (Putrescible)
- General Solid Waste (Non-putrescible)

Each of the previously mentioned categories has separate requirements in terms of licensing for transportation and landfill sites. NSW EPA consent is required for disposal, treatment and/or storage of Hazardous Waste.

15.2 Remediation Goal

The goal of remediation is to be able to provide a statement declaring that the site is environmentally suitable for the proposed for mixed commercial and residential uses.

15.3 Lateral & Vertical Extents of Contamination Requiring Remediation

Based on site observation and laboratory test results, it is our opinion that the fill material at location HA5 (Drawing No 13585/4-AA2) have been impacted by elevated concentrations of BaP and the presence of ACM on the surface.

The fill at and in the vicinity of HA1, HA2 and HA4, was impacted by the elevated concentrations of Zn and BaP for the proposed development.

The indicative areas, required for remediation under the proposed development, are presented below:

LOCATIONS / POTENTIAL AREAS OF CONCERN	ESTIMATED AREA (m^2)	ESTIMATED DEPTH / HEIGHT (m)	ESTIMATED VOLUME (m^3)	CONTAMINANTS	REMARKS
The area in the vicinity of HA5 (grassed area, excluding the hardstand)	18	0.4	7	➢ Bonded ACM and BaP	
Areas in the vicinity of locations HA2 and HA4	-	-	-	➢ Zn and BaP	Delineation (by sampling and testing) in the vicinity is required to determine the extent of Zn and BaP contamination.

LOCATIONS / POTENTIAL AREAS OF CONCERN	ESTIMATED AREA (m^2)	ESTIMATED DEPTH / HEIGHT (m)	ESTIMATED VOLUME (m^3)	CONTAMINANTS	REMARKS
The area in the Vicinity of HA1	-	-	-	➢ Zn and BaP	Delineation (by sampling and testing) in the vicinity is required to determine the extent of Zn and BaP contamination.
Abandoned underground tank (s)#	To engage geophysical survey to determinate the locations of the tank(s),if any	-	-	➢ Heavy Metals ➢ TPH ➢ BTEX ➢ PAH ➢ VOC ➢ Phenol	Assessment of soil (by sampling and testing) in the vicinity of the underground tank(s) (USTs) is required to determine the contamination status of the soil and remediation followed by validation (if required). This should be carried out after removal of the aboveground site features and geophysical survey for locating the UST(s) and the extent of identified contaminants (if any).
Site features	Footprints of the site features and 2 metres beyond the footprints	-	-	-	Additional Assessment of soil within the footprints to undertaken after the demolition and removal of the features.

 # The procedure for remediation strategy should be followed as detailed in Appendix D

The remediation areas and depths/height are estimates only based on the available information and could extend beyond the remediation areas laterally and vertically. These will be confirmed by sampling and testing.

The lateral and vertical extents of soil at and in the vicinity of the footprints of the site features will be confirmed by sampling and testing of identified contaminants (if any) after demolition.

15.4 Remediation Options

As discussed in this report, the contaminant identified on-site is primarily metals; BaP and asbestos (refer to Drawing No 13585/4-AA2). The elevated Zn concentrations were also detected at some locations. Based on the contaminants identified, the following remediation options were considered:

ADVANTAGES AND DISADVANTAGES OF REMEDIATION OPTIONS

REMEDIATION METHOD	ADVANTAGE	DISADVANTAGE	REMAINING SITE RISK
Excavation and Landfill Disposal	- Simple & straightforward process; - Short time frame; - All contaminants removed from the site; - Not overly expensive for smaller volumes of soil to be disposed of off-site.	- Adds to already filling landfill; - Requires movement of contaminated soil on public roads; - Importing clean fill required to fill the void.	None

REMEDIATION METHOD	ADVANTAGE	DISADVANTAGE	REMAINING SITE RISK
On-site Burial and Containment	- Retains soils within the site, thereby minimizing landfilling; - Cost saving (of Landfill Disposal) for large volumes; - Short time frame.	- May be subject to Council approval; - Retains contaminants within the site; - Additional investigations required prior to on-site burial; - Requires preparation, implementation, and monitoring of an ongoing environmental management plan (EMP); - Long-term cost involved; - Owner of contaminated soils remains liable; - Notation on Section 149 Certificate may be required; - Potential devaluation of land where on-site burial occurred.	- Breaching of capping layer - Potential risk to human health - Leaching of contaminants
Excavation and on-site treatment via spreading of impacted soil and hand-picking of ACM fragments	- Cost saving (of Landfill Disposal); - Alternative method for remediating large quantities of soils with low levels of contamination and bonded ACM; - Reducing contaminant concentrations to acceptable levels.	- May be subject to Council approval; - Trial & error process; - Disposal of some contaminated soils may still be required; - Not an option in this case due to the presence of asbestos in the friable fraction.	- Some “hot spots” may still remain - Potential risk to human health

Many factors such as advantages, disadvantages, risks and the costs of separating relatively small amounts of waste, compared to apparently less complicated disposal off-site, etc., need to be considered in the adoption of the final remediation strategy.

Based on the advantages, disadvantages, and risks of each of the remediation options, it is our opinion that the excavation of the contaminated soil/material and disposal at a facility is considered as an appropriate remediation strategy.

15.5 Waste Classification

Waste classification in accordance with "Waste *Classification Guidelines Part 1: Classifying Waste*", (NSW EPA 2014) is required to provide information to the nominated landfill facility regarding classification of the contaminated material/soil to be disposed of.

All landfill delivery dockets shall be provided to Geotechnique for inclusion in a final validation report.

Waste classification of contaminated soil at and in the vicinity of the locations of concern (HA2, HA4 and HA5) should be carried out during the delineation (by sampling and testing) to determine the extent of elevated concentrations of Zn and BaP at these locations.

15.6 Remediation Schedule

This section provides the schedule of remediation works. The appointed site remediation contractor may submit a works method statement for approval, offering an alternative works schedule:

- Disposal of the ACM and BaP contaminated soil (in the vicinity of HA5). Please refer to Appendix C for assessment and removal of asbestos material and asbestos impacted soil.
- Excavation and disposal of BaP contaminated soils at and in the vicinity of HA2 and HA4.
- Backfilling the excavated area(s) with validated soils, if required, once all remediation is complete.

15.7 Prior to Remediation

Prior to conducting remedial works on-site, the following procedures will be carried out:

- The category of remedial works proposed is considered Category 2 (subject to agreement by the council), as defined under the "*Managing Land Contamination: Planning Guidelines*"-*SEPP 55 Remediation of Land*. Development consent to carry out the works is not likely to be required. Under Clause 16 of the "*State Environmental Planning Policy No 55 – Remediation of Land*", a minimum of 30 days notice of the intention to proceed with remedial works must be given to the council.
- Notification must be provided by the remediation contractor to SafeWork NSW to dispose of the ACM contaminated soil at an EPA licensed landfill facility, specifically Class B Licence Removal Contractor for bonded asbestos. In the event of identification of asbestos in soil, a Class A Licences Asbestos Removal Contractor must be engaged followed by validation by a licensed asbestos assessor.
- The nominated licensed landfill shall be contacted and informed of the soil classification details in order to obtain an approval for acceptance of the contaminated soil. All documentation required by the landfill facility shall be completed as required.
- Marking of the contaminated areas by an Environmental Representative and fencing off with a red ribbon to prevent / minimize access during any future works.
- All intended environmental management measures (refer to Section 16.0) will be installed by the appointed contractor.
- No waste should be transported before acceptance of the application.
- Signage shall be placed at the site entrance, identifying the contact details of the appointed remediation contractor.
- The site shall remain secure (with a padlock) during non-working hours.
- Provide a remediation schedule to the Environmental Consultant, once the site owners or relevant party, has authorized the remediation.

15.8 During Remediation

The following procedures will be carried out during the remedial works:

- Remediation by landfill disposal of the contaminated soil. Validation sampling and testing shall be carried out following remediation.
- Excavation of the soil shall be instructed/supervised by the Environmental Consultant. The degree of involvement of the Environmental Consultant during remediation works will be governed by the requirements of the site owners or relevant party.

- All environmental management items shall be monitored and maintained during the course of the remediation works. The site superintendent appointed by the remediation contractor will carry out monitoring.
- The site shall be fully secured during and after working hours.
- The remediation contractor shall keep all landfill delivery dockets, with copies forwarded to the Environmental Consultant.

Should any asbestos-containing material (or suspected asbestos) be uncovered in the area(s) other than identified locations/areas during the course of the remediation works, an unexpected finds management protocol (Appendix E) must be implemented. Geotechnique shall be contacted for assessment and direction.

16.0 ENVIRONMENTAL / SITE MANAGEMENT PLAN

The appointed remediation contractor will be provided with a copy of this RAP and made aware of the contamination status of the soil and the remediation methodology to be adopted.

All remediation works will be carried out with due regard to the environment and to all statutory requirements. The works shall comply with the requirements of the following Acts, Regulation, and Guidelines:

- Protection of the Environment (Operations) Act
- NSW Work Health & Safety Act 2011
- NSW Work Health & Safety Regulation 2011
- How to Manage and Control Asbestos in the Workplace Code of Practice (2011)
- How to Safely Remove Asbestos Code of Practice (2011)
- Managing asbestos in or on soil, SafeWork NSW, March 2014
- NSW EPA Guidelines for the NSW Site Auditor Scheme (NSW EPA 2017)
- Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land – Department of Urban Affairs and Planning (DUAP/EPA 1998)

In addition to any statutory requirements, the contractor will be responsible for carrying out the remediation works with all due care to ensure that the following conditions are specifically complied with:

- Minimal wind-borne dust leaves the confines of the site. This will be continually monitored.
- Water containing suspended matter or contaminants will not leave the confines of the site, as this may pollute watercourses, either directly or indirectly through the stormwater drainage system.
- Material from exposed, non-validated surfaces is not to be tracked onto other areas of the site by personnel or equipment.
- Vehicles will be cleaned and secured so that mud, soil or water is not deposited on any public roadway or adjacent areas. A truck wash area will be set up for this purpose.
- Noise levels at the site boundaries will comply with the noise quality objectives of the region and/or legislative requirements.

The following sub-sections provide details of the environmental management practices to be employed at the site in order to comply with the statutory requirements, the relevant Development Control Plan and the previously mentioned items.

16.1 Working Hours

All remediation works would be carried out between the hours specified or required by the council.

16.2 Security / Safety Measures

Prior to any remediation works being carried out the existing fence line will be inspected and repaired, if required, to ensure no public access to the remediation works. The front gate will be closed and padlocked at the completion of each day. Adequate signage containing a "no unauthorized entry" statement as well as the contractor's name and contact details, both during and after working hours, will be erected at the site entrance.

A site superintendent appointed by the remediation and/or earthworks contractor will be present for the duration of the works to ensure implementation of the day-to-day works and maintenance of the environmental safeguards. The superintendent will also be responsible for locking the gates at the completion of each day.

All earthworks machinery used on the site will be fitted with warning lights and reverse signals.

16.3 Traffic Management / Truck Monitoring

Access to the site will be via the gate Days Road entry. Prior to exiting the site, trucks will pass over a shaker grid or truck wash bay.

At the completion of each working day, or as required during the course of each day, the adjacent public road will be inspected for any soil deposits from existing trucks, which will be cleaned up and returned to the site. If excess or regular deposits are occurring, the truck cleaning procedure will be reviewed and refined as necessary.

All loaded trucks will be fitted with secured covers over the entire load thereby preventing any loss of the load on public roads.

16.4 Dust Control

Generation of dust will be kept to a minimum at all times. During working hours, water sprays will be used to keep the surface of the excavation and any stockpiled soils (which will be kept to a minimum) reasonably damp in order to suppress any dust. Water used for dust suppression will be only the minimum required and will not be allowed to escape the confines of the excavation or the stockpile areas. Polythene sheets will be used to cover asbestos-contaminated soil stockpiles to minimize generation of dust. If excessive dust is being generated works will cease until the dust is sufficiently suppressed.

A complaints register will be set up on-site for recording complaints from residents or tenants, with regard to dust. The complaints register will be completed by the Site Superintendent, as well as the corrective actions implemented.

16.5 Sediment and Stormwater Containment

Sediment control fencing will be installed along the boundaries of the site and/or downslope of the remediation areas. The fencing will comprise geofabric filter stretched between posts at appropriate spacing. The base of the fabric will be buried in the ground and/or adequately weighted. The fabric will be an approved material.

In areas identified as potentially being subject to excessive stormwater water flow during rain periods, additional rows of sediment fencing and/or hay bales will be placed to minimize flow rates.

A temporary sediment basin will be formed at the lowest elevation in the site. Bunds will be formed where possible to direct stormwater water flows into the basin.

The remediation process will be carried out through the excavation of contaminated soil and immediate loading on dump trucks for disposal. If for any reason, a temporary stockpile of contaminated soil is formed the above management procedures will be adopted. In addition, once the stockpile is removed the surface soils beneath will be sampled and tested to ensure no contaminants have affected the soil from the stockpile(s). The sampling frequency will be as per the validation requirements (refer to Section 18.0).

The sediment control measures will be regularly inspected and maintained by the site foreman/superintendent. Should any section be damaged or not perform to satisfaction it will be immediately repaired or replaced.

16.6 Noise Management

Noise impacts will generally result from the excavators and truck movements within the site and surrounding streets, all of which have noise levels within levels normally expected at a construction site.

In order to minimize noise impacts during the remediation works, the following measures will be implemented:

- Construction noise will be confined to the council allowable working hours. No machinery/trucks will be permitted to access the site outside these hours of operation.
- Signage at the site entrance providing contact details for the site superintendent so that noise complaints can be readily addressed.
- Establishment and monitoring of a complaints log.

16.7 Waste and Asbestos Management

Disposal of contaminated soil (waste) generated by the remediation works will be in accordance with Section 15.0 of this RAP and as detailed in Appendix C.

The following remediation procedures will be implemented during removal of the asbestos contaminated soil within the site:

- Contractors should be made aware of the presence of bonded ACM fragments. It could be mixed with the soil.
- Seek approval from a licensed landfill prior to disposal of ACM contaminated soil.

- A SafeWork NSW Class B licensed asbestos removalist must be engaged to supervise excavation and loading of the ACM or ACM mixed with the soil. In the event of identification of asbestos in soil, a Class A Licences Asbestos Removal Contractor must be engaged followed by validation by a licensed asbestos assessor.
- An exclusion zone from the excavated area must be established, barricaded and access restricted to essential personnel. The appropriate asbestos warning signs must be erected close to the exclusion zone.
- NATA accredited asbestos air monitoring must be established in the vicinity of the exclusion zone for airborne asbestos by a suitably qualified occupational hygienist.

  If the results of the asbestos air monitoring indicate that airborne asbestos levels exceed 0.01 fibers/mL, the contractors must cease work immediately and the occupational hygienist must provide appropriate measures to rectify the issue.
- All workers within the exclusion zone must wear P2 dust masks/respirators, disposable coveralls and other appropriate personal protection equipment (PPE).

  The coveralls and P2 dust masks must be disposed of in a heavy duty polythene bag every time the worker leaves the exclusion zone and securely stored in a lined bin and disposed of at the licensed landfill.
- During working hours a water cart should be used to suppress any dust. Water used for dust suppression will be only the minimum required and will not be allowed to escape the confines of the site.
- A covered, leak-proof vehicle must transport the asbestos-contaminated soil.

The remediation contractor will keep records of all off-site waste disposals.

The works area will be kept in a tidy condition so that waste materials generated by the earthworks or workers on-site will be contained. Rubbish disposal bins with heavy lids will be provided within the site compound for personal litter. These bins will be monitored and emptied on a regular basis when near full. Any loose rubbish generated by the earthworks, capable of being blown off the site in high winds, will be hand collected and deposited into the bins provided. No burning of rubbish will be permitted.

All employees will be informed of the necessity to maintain a tidy environment. The site superintendent will carry out a daily inspection at the completion of works, prior to leaving the compound.

Waste materials that may be generated by the works (apart from the asbestos and/or non-recyclable materials possibly generated through the remediation works) include tree and shrub vegetation, domestic and human waste. The disposal methods for these types of waste will be as follows:

- Portable toilet and hand cleaning facilities will be provided on-site. The resultant sewerage will be collected and regularly disposed of off-site, by contract, in accordance with the relevant regulations.
- Domestic waste will be stored in secure waste bins and appropriately disposed of on a regular basis to a licensed landfill.

16.8 Contact Personnel

In the event of complaints, incidents or other matters associated with site remediation works the following contacts are applicable:

Project Manager:	Bonus and Associates Architects Pty Ltd	TBA
Environmental Consultant:	Geotechnique Pty Ltd Danda Sapkota	4722 2700
Asbestos Assessor:	TBA or Australian Industry Group (John Tiong)	9466 5500
Remediation Contractor:	Not yet appointed	
Fire Brigade:		000

17.0 OCCUPATIONAL HEALTH & SAFETY PLAN

A site-specific Occupational Health and Safety (OH&S) Plan must be developed to ensure that the remediation works are conducted in a safe manner. Personnel working on the site are required to read and understand the OH&S Plan prior to works commencing.

17.1 Potential Contaminants Associated with Human Health Issue

The contaminants identified in the soil and associated with human health issue are listed below, with brief descriptions of physical form and some general health and safety information. Note that the effects listed are usually the result of prolonged exposure to high concentrations. These extremes are not likely to be achieved during the works proposed:

Benzo(a)Pyrene: According to the IARC, Benzo(a)Pyrene is a listed known human carcinogen (Group 1). The primary routes for human exposure are inhalation and ingestion. Benzo(a)Pyrene can cause skin irritation with rash and/or burning sensations. Exposure to sunlight and the chemical together can increase these effects. Repeated exposure can cause skin changes such as thickening and darkening. Exposure can irritate and/or burn the eyes on contact.

Asbestos**:** According to the IARC asbestos is a listed known human carcinogen. Asbestos mainly affects the lungs and the membrane that surrounds the lungs. Breathing high levels of asbestos fibers for a long time may result in scar-like tissue in the lungs and in the pleural membrane (lining) that surrounds the lung. This disease is called asbestosis and is usually found in workers exposed to asbestos, but not to the general public. People with asbestosis have difficulty breathing, often a cough and in severe cases heart enlargement. Asbestosis is a serious disease and can eventually lead to disability and death. Breathing lower levels of asbestos may result in changes called plaques in the pleural membranes. Pleural plaques can occur in workers and sometimes in people living in areas with high environmental levels of asbestos. Effects on breathing from pleural plaques alone are not usually serious, but higher exposure can lead to a thickening of the pleural membrane that might restrict breathing. Other diseases caused by the inhalation of asbestos fibres include lung cancer and mesothelioma.

Bonded asbestos pieces/fragments generally do not present a significant health risk unless the fragments are in poor condition and/or mechanically worked on (such as tooled, cut, sanded, abraded or machined), which may release asbestos dust or fibers. Asbestos dust contains tiny almost indestructible fibers, which can cause damage to the lungs when breathed in.

Contact of the contaminated soil with the skin and eyes, or inhalation of associated dust, should be prevented.

17.2 Personal Protective Equipment (PPE)

In order to minimize exposure to the contaminants within the soils and to ensure the safety of workers, the minimum level of PPE for workers actively involved in handling the contaminated soil (particularly asbestos) includes:

- Disposable long sleeve worker coveralls/overalls to be disposed of at the completion of each day.
- Highly visible safety vests.
- Waterproof boots with steel toe and shank, complying with AS2210 "Occupational Protective Footwear".
- Safety glasses with side shields, complying with AS1337 "Eye Protection for Industrial Applications".
- Hard hat, meeting AS1801 "Occupational Protective Helmets".
- Dust mask or half-face respirator with a particulate filter. If significant amounts of asbestos-cement pieces are encountered and air monitoring for dust and asbestos fibers indicates the presence of airborne asbestos (this is not expected), a full-face respirator with the particulate filter should be worn.
- Nitrile work gloves, complying with AS2161 "Occupational Protective Gloves".

It should be noted that wearing PPE can reduce the dexterity of workers and senses of vision, hearing, and smell. Heat stress is another important that due consideration that must be taken into account during hot weather.

Smoking, eating or drinking on-site will only be carried out in a designated lunchroom. Hands are to be washed thoroughly upon completion of work and prior to eating, drinking or any other hand-to-mouth activity.

Visitors to the site, who will be observing activities being undertaken in or around excavations, should follow appropriate guidelines to prevent excessive dermal contact or inhalation of dust arising from the handling of contaminated materials. All visitors should wear the following PPE during remediation works:

- Highly visible safety vests.
- Waterproof boots with steel toe and shank, complying with AS2210.
- Safety glasses with side shields, complying with AS1337.
- Hard hat, meeting AS1801.
- Dust masks.

The abovementioned PPE will also be required for site workers, or consultants not directly associated with the remedial works, but present on the site.

17.3 Safety Measures around Excavations

The safety measures to be adopted during any deep excavation works (i.e. deeper than 1.2m) are as follows:

- Only the minimum number of workers necessary will be used to adequately and safely complete the job at hand.

- During non-working hours, the entire site will be secured.
- All personnel performing the works in and around the excavation will wear appropriate personal protective equipment, as listed above.
- Environmental conditions will be monitored prior to excavation, including wind direction, wind speed, temperature and the likelihood of rain. Excavation works will not take place during periods of high wind, elevated temperature or heavy rain.
- Any deep excavation that is to remain open during non-working hours will be subject to dust suppression controls in the form of water sprinklers and/or protective plastic coverings.

18.0 SITE VALIDATION

Validation sampling and testing form a crucial part of the site remediation process in that it monitors the success or otherwise of the adopted remediation strategy and confirms the suitability of the site for the proposed residential (with garden/accessible soil) land use.

The objective of the validation is to obtain sufficient information and data to make the following conclusions:

1. All identified contaminated soil is remediated.
2. The site is suitable for residential land use.

18.1 Sampling and Testing Plan

18.1.1 At and in the vicinity of Location (HA5) Impacted by the ACM and BaP

Following completion of the remediation of ACM contaminated soils, by Class B Asbestos Removal Contractor, validation of the residual soil must be carried out by a competent person or Licensed Asbestos Assessor. In the event of identification of friable asbestos in the soil during the remediation stage, a Class A Licensed Asbestos Removal Contractor must be engaged.

For asbestos assessment, the adopted validation assessment criteria are:

- 0.01% w/w for bonded ACM (residential with accessible soil);
- 0.001% of friable asbestos in soil; and
- No visible asbestos on the ground surface.

18.1.2 Soil Impacted by Zn and/or BaP

Following completion of the remediation of metals and BaP impacted soils at and in the vicinity of HA2, HA4 and HA5, by excavation and disposal at a licensed facility, the residual soil should be validated.

The following samples will be recovered from each excavated area:

- At least one sample (not more than 5m interval along the wall) from each of the four walls to the full depth (surface and thereafter 0.3m vertical interval) of excavation.
- At least one sample or at a density of one sample per 25 square metres (m^2) from the base to a depth of 0.1m.

18.1.3 Underground Storage Tanks(s) and impacted soil in the vicinity of UST(s)

Following removal/disposal of the USTs and the impacted soil (in the vicinity of the USTs) at a licensed facility, in accordance with the remedial strategy (as detailed in Appendix D), the residual soil within the excavated pit in and in the vicinity of former USTs, must be validated.

Validation sampling should be in accordance with the NSW EPA Technical Notes: Investigation of Service Station Sites (NSW 2014a) and Schedule B2 of the NEPM 1999 (April 2013).

The following samples will be recovered from each excavated area:

- At least one sample (not more than 5m interval along the wall) from each of the four walls to the full depth (surface and thereafter 0.3m vertical interval) of excavation.
- At least one sample or at a density of one sample per 25 square metres (m^2) from the base to a depth of 0.1m.
- The recovered samples should be analysed for the potential contaminants of concern, including heavy metal, TRH, BTEX, PAH, VOC and Phenol. Additional contaminants of concern should be included (if required) based on the site observation during the field sampling.

All landfill delivery dockets shall be provided to an environmental consultant for inclusion in a validation report.

Quality assurance and quality control (QA/QC) samples will be prepared.

The validation and QA/QC samples will be forwarded to NATA accredited laboratories for analysis.

The site is proposed for residential (with garden/accessible soil) land use. The validation assessment criteria adopted will be the available Health Investigation Levels (HIL) for *residential with minimal opportunities to soil access (HIL B)*, Ecological Investigation Levels (EIL) and/or Ecological Screening Levels (ESL) for *urban residential and public open space.*

If the validation test results meet the adopted acceptance criteria the remediation area will be deemed as satisfactorily remediated.

If the validation test results do not meet the validation criteria, remediation will continue followed by additional validation sampling and testing. This process will continue until the test results meet the acceptance criteria.

18.2 Imported Material

Any material imported to the site will be validated as being suitable for use within the site prior to use. The imported fill must be free from asbestos, ash, and odour, not be discoloured and acid sulfate soil. Environmentally, virgin excavated natural material (VENM) or excavated natural material (ENM) will be suitable for use as fill for the site. Salinity assessment might be required.

19.0 CONTINGENCY PLAN

In some circumstances, remediation works can be unpredictable. The following table presents anticipated possible problems or events and the corresponding corrective actions to be implemented:

Incident / Event	Corrective Action
Spillage/leakage of oil, hydraulic fluid, or other fuels from the excavator and/or trucks	For major spill; place sandbags down the slope, a cover area in the sand, excavate impacted sand and soils and dispose of at an appropriate EPA approved facility. For minor spill; the cover area in the sand, excavate impacted sand and soils and dispose at an EPA approved facility. Stop spillage/leakage where apparent.
Failure of sediment control measures	Replace or repair failed control measure. Determine the reason for failure and ensure no repeat. Clean up any materials penetrating the safeguard and return to either the stockpile or excavation (origin).
Excessive dust generation	Cease activities until more appropriate dust control measures can be implemented. Cover all areas generating dust with plastic sheeting. Improve water control (i.e. sprays) where appropriate. Assess measures being implemented.
Discovery of asbestos cement pieces/fragments locations other than identified locations/areas during remediation	An unexpected finds management protocol (Appendix E) to be implemented.
Discovery of unexpected contamination and suspect materials that are not identified from the previous assessment	An unexpected finds management protocol (Appendix E) to be implemented.
Excessive noise	Identify source and add or amend noise attenuation equipment.

19.1 Unexpected Finds Management Protocol

In the event that unexpected finds and/or suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheeting/pieces/pipes, ash material, imported fill, etc.) are encountered during remediation work / future earthworks, the following actions are to be undertaken in accordance with the procedure detailed in Appendix C.

19.1.1 Management of Unexpected Finds and/or Suspect Materials

If unexpected finds and/or suspect materials are encountered:

- Works are to be ceased.
- An environmental consultant is to be engaged to take appropriate action.
- If contamination is identified, the contaminated materials must be disposed of at an EPA licensed landfill facility with an appropriate waste classification.

19.1.2 Management of Bonded Asbestos Containing Material (ACM)

If bonded ACM is encountered, the following measures are implemented:

- Engage an NSW WorkCover accredited Class B asbestos contractor.
- Removal of the asbestos waste must be carried out in accordance with the requirements of the regulators, such as NSW WorkCover and NSW EPA.
- A WorkCover Licensed Asbestos Assessor should be engaged to provide a clearance certificate.

19.1.3 Management of Friable Asbestos within the Soil

It is recommended that the following measures are implemented if friable asbestos is encountered:

- Engage an NSW WorkCover accredited Class A Asbestos contractor.
- Removal of the asbestos waste must be carried out in accordance with the requirements of the regulators, such as NSW WorkCover and NSW EPA
- A WorkCover Licensed Asbestos Assessor must be engaged to provide a clearance certificate

20.0 CONCLUSION AND RECOMMENDATIONS

Based on this ACA and the previous Stage 2 CA, it was indicated that soil within the site was impacted by asbestos containing material (ACM) (>7mm fraction) and/or elevated concentrations of BaP at locations as indicated and tabulated on Drawing No 13585/4-AA2. Remediation is therefore deemed necessary.

The RAP has been prepared to provide guidance to contractors cleaning up/manage the contaminated soil/material within the site.

Based on the advantages, disadvantages, and risks of each of the remediation options, it is our opinion that remediation of the BaP and/or asbestos impacted soils at and in the vicinity of HA5 as shown on Drawing No 13585/4-AA2, by excavation of the contaminated soil and disposal at a licensed landfill facility, is considered appropriate for the site. Based on the test results and the presence of ACM at location HA5, including Toxicity Characteristic Leaching Procedure (TCLP) the fill/ soils at and in the vicinity of location, HA5 is classified as **"Special Waste – Asbestos Waste" for off-site disposal** as detailed Table K.

The waste must be disposed of at a facility that can lawfully accept the waste. All landfill delivery dockets shall be provided for inclusion in a final validation report.

Due to the elevated concentrations of BaP at locations, HA2 (0.5-0.8m) and HA4 (0.03-0.15m), exceeding the HIL B and BaP TEQ, delineation (by sampling and testing) at and in the vicinity these locations will be required to determine the extent of BaP contamination and waste classification of soil for off-site disposal. This could be carried out during the assessment of the footprint of the existing features such as brick house/building, shed, brick garage, concrete hardstands, etc. as shown as on Drawing No 13585/1-AA1.

The elevated concentrations of Zn and BaP at location HA1 (0-0.15m) and HA2 (1.0-1.3m) would not pose a risk of harm to human health under the proposed development, however it might present a risk of harm to the environment (terrestrial ecosystems), that due consideration must be taken if the soil in the vicinity of these locations is used for landscaping.

This RAP once implemented and validated the site (for identified contaminants), will render the site suitable for the proposed land use.

This RAP should be updated (if required) after the delineation (by sampling and testing) in the vicinity of identified locations of concern as mentioned above and/or assessment of soil in the footprints of the existing features and in the vicinity of the abandoned UST(s).

The proposed remediation works are considered to be Category 2 (subject to agreement by the relevant council). A minimum of 30 days notice of the intention to proceed with remedial works must be given to the council.

The Environmental/Site Management Plan, Occupational Health & Safety Plan, and Contingency Plan to be implemented during the remediation work are outlined in Sections 16.0, 17.0 and 19.0 of the report.

Following completion of the remediation works, a suitable validation sampling and testing plan, as outlined in Section 18.0 of the report, must be implemented. On completion of validation, a report will be prepared to recommend the suitability of the site for the proposed residential with minimal opportunities for soil access

It should be noted that SafeWork NSW (also known previously as WorkCover NSW) holds records on Dangerous Good Licence 35/009550 relating to the storage of dangerous goods at the Lots 6, 7, 8 DP136422 & Lot 9 Section 6 DP862 (Appendix B).

Assessment of soil in the vicinity of the previously installed underground storage tank (s), including the groundwater was beyond the scope of the additional assessment.

The following works are required to be implemented after completion of demolition and removal of the existing site features by a licensed contractor:

- Further assessment and clearance of asbestos contamination at and in the vicinity of the identified location of concern (HA5) in accordance with the procedure as detailed in Appendix C and Section 18.1 of this report.
- Delineation (by sampling and testing) at the identified locations of concern (HA2 and HA4), to determine the extent of BaP contamination and to determine the waste classification.
- Assessment of contamination status of soil/material situated within the footprints of the existing site features (such as brick house/building, shed, brick garage, concrete hardstands, etc. as detailed in Drawing No 13585/1-AA1), will also be required after demolition/removal. The purpose of this is to ascertain the presence or otherwise of “suspect” materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos, ash particles, etc.) and fill, which were not encountered during fieldwork for this assessment. If any contaminants are identified, the site could be made suitable for the proposed use following successful remediation and validation.
- Assessment of soil in the vicinity of buried underground petroleum storage tank(s) (USTs) should be carried out after the removal of the USTs following the removal of aboveground features, including hardstand/building slabs. A non-intrusive geophysical survey shall be carried out to locate the USTs within the site after the demolition and removal of the above ground existing features. The assessment of soil in the vicinity of the identified USTs should be carried in accordance with NSW EPA Technical Notes: Investigation of Service Station Sites (NSW EPA 2014a). If contamination identified, remediation followed by validation must be carried out in order to render the site suitable for the proposed use. The remediation and validation strategy for the abandoned USTs and the impacted soil shall be carried in accordance with the procedure as detailed in Appendix D. The RAP should be updated (if required) and submitted to the council for approval based on the further assessment within the site.

  It should be noted that removal of tank(s) and associated features (if any) must be undertaken by duly qualified contractors in accordance with NSW legislation and guidance, relevant Australian Standards, and applicable work health and safety legislation (please: see Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW 2005).

- Assessment to determine the contamination status of groundwater should be carried out. Assessment of soil gas vapour may be required.

An Unexpected Finds Management Protocol (Section 19.1 and Appendix E) should be implemented if suspect materials or fill, (different to those encountered during the previous assessment) are encountered during future demolition / remediation work / earthworks or masked by overgrown grass or in between the sampling locations.

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 2014b; NSW EPA resource recovery exemptions and orders under the Protection of the Environment Operations (Waste) Regulation 2014; or NSW EPA *Certification: Virgin excavated natural material* is undertaken prior to disposal at a facility that can lawfully accept the materials.

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 discoloured and not acid sulfate soil or potential acid sulfate soil. The imported fill should either be VENM or ENM.

21.0 LIMITATIONS

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.

To the best of our knowledge, all information obtained and contained in this report is true and accurate. No further investigation has been carried out to authenticate the information provided. Supporting documentation was obtained where possible, some of which is contained in this report.

This report has been prepared for the purpose stated within based on the agreed scope of work. The relevant council and any relevant authorities may rely on the report for development and building application assessment processes. 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.

The information in this report is considered accurate at the completion of field sampling on 3 April 2018, in accordance with the current conditions of the site. Any variations to the site form or use beyond that date will nullify the conclusion stated.

No contamination assessment can eliminate all risk; even a rigorous professional assessment might not detect all contamination within a site. Although the assessment conducted at the site was carried out in accordance with current NSW guidelines, the potential always exists for contaminants and contaminated soils to be present between sampled locations.

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

LIST OF REFERENCES

AS4482.1-2005, *Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds,* Standards Australia.

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WorkCover NSW 2005, Storage and Handling of Dangerous Goods Code of Practice, WorkCover, NSW

DRAWINGS

Drawing No 13585/4-AA1	*Borehole Locations*
Drawing No 13585/4-AA2	*Revised Locations of Concern*
Drawing No 13585/1-AA1	*Site Features*

LEGEND

- Borehole (September 2016)
- Borehole (April 2018)

Imagery ©2017 NearMap.com

0 6 12 18 24 30m

Scale 1:600

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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

Bonus & Associates Architects
Victoria Road, Day Street, Formosa Street, Thornley Street
Drummoyne

Borehole Locations

Drawing No: 13585/4-AA1
Job No: 13585/4
Drawn By: MH
Date: 5 April 2018
Checked By: JH/DS

File No: 13585-4
Layers: 0, AA1

Sample Location	Depth (m)	Contaminant	Concentration (mg/kg)	Level (mg/kg)		
				HIL B	EIL	ESL
HA1	0-0.15	Zinc (Zn) and Benzo(a)Pyrene (BaP)	**520, 1.5**	Zn=60000	Zn=520	BaP=0.7
HA2	0.5-0.8	Zn, BaP TEQ and BaP	**650, 19, 14**	Zn=60000 BaP TEQ=4	Zn=520	BaP=0.7
	1.0-1.3	Zn and BaP	**600, 2**	Zn=60000	Zn=520	BaP=0.7
HA4	0.03-0.15	BaP TEQ and BaP	**12, 8.8**	BaP TEQ=4	-	BaP=0.7
HA5	Surface	bonded ACM	**-**	No Visual ACM & No Asbestos Detected in Soil		
	0-0.15	BaP TEQ and BaP	**9.4, 6.9**	BaP TEQ=4	-	BaP=0.7

Notes: HIL B: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
EIL : Ecological Investigation Level of aged Metals for urban residential land use
ESL : Ecological Screening Level
ACM : Asbestos Containing Material

LEGEND

Borehole

Imagery ©2017 NearMap.com

0 6 12 18 24 30m

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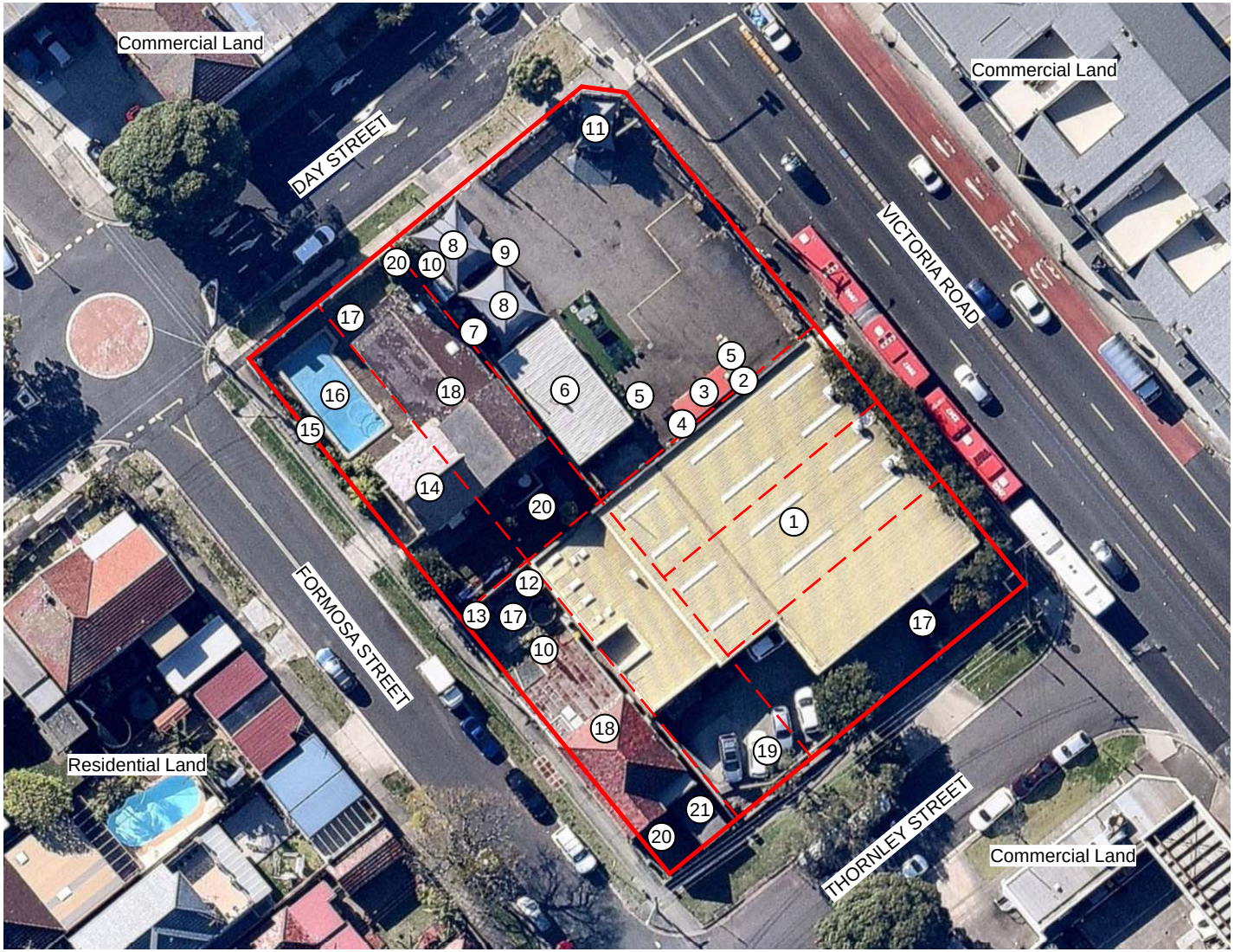
Bonus & Associates Architects
Victoria Road, Day Street, Formosa Street, Thornley Street
Drummoyne

Revised Locations of Concern

Drawing No: 13585/4-AA2
Job No: 13585/4
Drawn By: MH
Date: 30 April 2018
Checked By: DS

File No: 13585-4
Layers: 0, AA2



S/F#	Description
1	Brick building, metal roof
2	Cooking gas cylinder
3	Metal storage container (restaurant)
4	Portable toilet
5	Cooking oil tins
6	Brick office, metal roof
7	Car wash tank
8	Canvas shade
9	Car wash liquid
10	Timber shed, metal roof
11	Elevated car platform
12	Metal shed
13	Aviary
14	Underground personal car workshop
15	Brick fence, slanting outwards
16	Swimming pool
17	Concrete pavement
18	Brick house, tile roof
19	Exposed drainage pipe and drainage pit
20	Grass covered
21	Brick garage, tile roof

S/F#: Site Feature Number

LEGEND

(#) Site Feature Number

0 6 12 18 24 30m

Scale 1:600

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NOTES

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Bonus & Associates Architects
Victoria Road, Day Street, Formosa Street, Thornley Street
Drummoyne

Site Features

Drawing No: 13585/1-AA1
Job No: 13585/1
Drawn By: MH
Date: 2 December 2015
Checked By: GC

File No: 13585-1
Layers: 0, AA1

LABORATORY SUMMARY TABLES

TABLES

TABLE A
RINSATE SAMPLE
(Ref No: Ref No:13585/4)

ANALYTE	Rinsate R1 5/04/2018
METAL	**(mg/L)**
Arsenic	<0.02
Cadmium	<0.001
Chromium	<0.005
Copper	<0.005
Lead	<0.02
Mercury	<0.00005
Nickel	<0.005
Zinc	<0.01
TOTAL RECOVERABLE HYDROCARBON (TRH)	**(µg/L)**
F1 (C6-C10 less BTEX)	<50
F2 (>C10-C16)	#N/A
F3 (>C16-C34)	<500
F4 (>C34-C40)	<500
BTEX	**(µg/L)**
Benzene	<0.5
Toluene	<0.5
Ethyl Benzene	<0.5
Xylenes	<1.5
POLYCYCLIC AROMATIC HYDROCARBON (PAH)	**(µg/L)**
Total PAH	<1
Naphthalene	<0.1
Benzo(a)Pyrene	<0.1
ORGANOCHLORINE PESTICIDE (OCP)	**(µg/L)**
Hexachlorobenzene (HCB)	<0.1
Heptachlor	<0.1
Aldrin+Dieldrin	<0.2
Endrin	<0.1
Methoxychlor	<0.1
Mirex	<0.1
Endosulfan (Alpha, Beta & Sulphate)	<0.3
DDD+DDE+DDT	<0.6
Chlordane (alpha & gamma)	<0.2

TABLE B
TRIP SPIKE SAMPLE
(Ref No: Ref No:13585/4)

Trip Spike	Sampling Date	BTEX			
		Benzene	Toluene	Ethylbenzene	Xylenes
Trip Spike TS1	5/04/2108	110%	78%	100%	93%

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

TABLE C
DUPLICATE SAMPLE
(Ref No: Ref No:13585/4)

ANALYTE	HA5 0.0-0.15 (m) mg/kg	D1 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METAL			
Arsenic	5	7	33
Cadmium	0.8	0.8	0
Chromium	12	30	86
Copper	65	66	2
Lead	500	270	60
Mercury	0.25	0.16	44
Nickel	7	17	83
Zinc	390	700	57
TOTAL RECOVERABLE HYDROCARBONS (TRH)			
F1 (C6-C10 less BTEX)	<25	31	-
F2 (>C10-C16)	<25	66	-
F3 (>C16-C34)	150	360	82
F4 (>C34-C40)	<120	<120	-
BTEX			
Benzene	<0.1	<0.1	-
Toluene	<0.1	<0.1	-
Ethyl Benzene	<0.1	<0.1	-
Xylenes	0.8	0.9	12
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	9.4	3.9	83
Total PAH	64	24	91
Naphthalene	0.1	<0.1	-
Benzo(a)Pyrene	6.9	2.8	85
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	-
CYANIDES & PHENOLS			
Cyanides	0.7	0.6	15
Phenols	<5	<5	-

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TABLE C
DUPLICATE SAMPLE
(Ref No: 13585/4-AA)

ANALYTE	HA5 0.0-0.15 mg/kg	D1 (m) mg/kg	RELATIVE PERCENTAGE DIFFERENCE %
Volatile Organic Compounds (VOC)			
MtBE (Methyl-tert-butyl ether)	<0.1	<0.1	-
Dichlorodifluoromethane (CFC-12)	<1	<1	-
Chloromethane	<1	<1	-
Vinyl chloride (Chloroethene)	<0.1	<0.1	-
Bromomethane	<1	<1	-
Chloroethane	<1	<1	-
Trichlorofluoromethane	<1	<1	-
Acetone (2-propanone)	<10	<10	-
Iodomethane	<5	<5	-
1,1-dichloroethene	<0.1	<0.1	-
Acrylonitrile	<0.1	<0.1	-
Dichloromethane (Methylene chloride)	<0.5	<0.5	-
Allyl chloride	<0.1	<0.1	-
Carbon disulfide	<0.5	<0.5	-
trans-1,2-dichloroethene	<0.1	<0.1	-
1,1-dichloroethane	<0.1	<0.1	-
Vinyl acetate	<10	<10	-
MEK (2-butanone)	<10	<10	-
cis-1,2-dichloroethene	<0.1	<0.1	-
Bromochloromethane	<0.1	<0.1	-
Chloroform	<0.1	<0.1	-
2,2-dichloropropane	<0.1	<0.1	-
1,2-dichloroethane	<0.1	<0.1	-
1,1,1-trichloroethane	<0.1	<0.1	-
1,1-dichloropropene	<0.1	<0.1	-
Carbon tetrachloride	<0.1	<0.1	-
Dibromomethane	<0.1	<0.1	-
1,2-dichloropropane	<0.1	<0.1	-
Trichloroethene (Trichloroethylene -TCE)	<0.1	<0.1	-
2-nitropropane	<10	<10	-
Bromodichloromethane	<0.1	<0.1	-
MIBK (4-methyl-2-pentanone)	<1	<1	-
cis-1,3-dichloropropene	<0.1	<0.1	-
trans-1,3-dichloropropene	<0.1	<0.1	-
1,1,2-trichloroethane	<0.1	<0.1	-
1,3-dichloropropane	<0.1	<0.1	-
Chlorodibromomethane	<0.1	<0.1	-
2-hexanone (MBK)	<5	<5	-
1,2-dibromoethane (EDB)	<0.1	<0.1	-
Tetrachloroethene (Perchloroethylene,PCE)	<0.1	<0.1	-
1,1,1,2-tetrachloroethane	<0.1	<0.1	-
Chlorobenzene	<0.1	<0.1	-
Bromoform	<0.1	<0.1	-
cis-1,4-dichloro-2-butene	<1	<1	-
Styrene (Vinyl benzene)	<0.1	<0.1	-
1,1,2,2-tetrachloroethane	<0.1	<0.1	-
1,2,3-trichloropropane	<0.1	<0.1	-
trans-1,4-dichloro-2-butene	<1	<1	-
Isopropylbenzene (Cumene)	<0.1	<0.1	-
Bromobenzene	<0.1	<0.1	-
n-propylbenzene	<0.1	<0.1	-
2-chlorotoluene	<0.1	<0.1	-
4-chlorotoluene	<0.1	<0.1	-
1,3,5-trimethylbenzene	<0.1	<0.1	-
tert-butylbenzene	<0.1	<0.1	-
1,2,4-trimethylbenzene	<0.1	<0.1	-
sec-butylbenzene	<0.1	<0.1	-
1,3-dichlorobenzene	<0.1	<0.1	-
1,4-dichlorobenzene	<0.1	<0.1	-
p-isopropyltoluene	<0.1	<0.1	-
1,2-dichlorobenzene	<0.1	<0.1	-
n-butylbenzene	<0.1	<0.1	-
1,2-dibromo-3-chloropropane	<0.1	<0.1	-
1,2,4-trichlorobenzene	<0.1	<0.1	-
Naphthalene	<0.1	<0.1	-
Hexachlorobutadiene	<0.1	<0.1	-
1,2,3-trichlorobenzene	<0.1	<0.1	-

TABLE D
SPLIT SAMPLE
(Ref No: Ref No:13585/4)

ANALYTE	HA6 0.1-0.25 (m) mg/kg (SGS)	Split S1 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METAL			
Arsenic	4	5	22
Cadmium	<0.3	<0.4	-
Chromium	6.6	14	72
Copper	23	23	0
Lead	69	62	11
Mercury	0.1	0.1	0
Nickel	4.5	7	43
Zinc	40	50	22
TOTAL RECOVERABLE HYDROCARBONS (TRH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	#N/A	<50	-
F3 (>C16-C34)	<90	<100	-
F4 (>C34-C40)	<120	<100	-
BTEX			
Benzene	<0.1	<0.2	-
Toluene	<0.1	<0.5	-
Ethyl Benzene	<0.1	<1	-
Xylenes	<0.3	<1	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene TEQ	<0.3	<0.5	-
Total PAH	<0.8	0.2	-
Naphthalene	<0.1	<1	-
Benzo(a)Pyrene	<0.1	0.07	-
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	-
Endosulfan (alpha (I), beta (II) & sulphate)	<0.5	<0.3	-
DDD+DDE+DDT	<0.6	<0.3	-
Chlordane (alpha & gamma)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<0.1	-
CYANIDES & PHENOLS			
Cyanides	<0.5	<0.5	-
Phenols	<5	<5	-

TABLE D
SPLIT SAMPLE
(Ref No: Ref No:13585/4)

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ANALYTE	HA6 0.1-0.25 mg/kg (SGS)	SPLIT SAMPLE S1 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCE %
Volatile Organic Compounds (VOC)			
MtBE (Methyl-tert-butyl ether)	<0.1	<1	-
Dichlorodifluoromethane (CFC-12)	<1	<1	-
Chloromethane	<1	<1	-
Vinyl chloride (Chloroethene)	<0.1	<1	-
Bromomethane	<1	<1	-
Chloroethane	<1	<1	-
Trichlorofluoromethane	<1	<1	-
Acetone (2-propanone)	<10	<1	-
Iodomethane	<5	<1	-
1,1-dichloroethene	<0.1	<1	-
Acrylonitrile	<0.1	<1	-
Dichloromethane (Methylene chloride)	<0.5	<1	-
Allyl chloride	<0.1	<1	-
Carbon disulfide	<0.5	<1	-
trans-1,2-dichloroethene	<0.1	<1	-
1,1-dichloroethane	<0.1	<1	-
Vinyl acetate	<10	<1	-
MEK (2-butanone)	<10	<1	-
cis-1,2-dichloroethene	<0.1	<1	-
Bromochloromethane	<0.1	<1	-
Chloroform	<0.1	<1	-
2,2-dichloropropane	<0.1	<1	-
1,2-dichloroethane	<0.1	<1	-
1,1,1-trichloroethane	<0.1	<1	-
1,1-dichloropropene	<0.1	<1	-
Carbon tetrachloride	<0.1	<1	-
Dibromomethane	<0.1	<1	-
1,2-dichloropropane	<0.1	<1	-
Trichloroethene (Trichloroethylene -TCE)	<0.1	<1	-
2-nitropropane	<10	<1	-
Bromodichloromethane	<0.1	<1	-
MIBK (4-methyl-2-pentanone)	<1	<1	-
cis-1,3-dichloropropene	<0.1	<1	-
trans-1,3-dichloropropene	<0.1	<1	-
1,1,2-trichloroethane	<0.1	<1	-
1,3-dichloropropane	<0.1	<1	-
Chlorodibromomethane	<0.1	<1	-
2-hexanone (MBK)	<5	<1	-
1,2-dibromoethane (EDB)	<0.1	<1	-
Tetrachloroethene (Perchloroethylene,PCE)	<0.1	<1	-
1,1,1,2-tetrachloroethane	<0.1	<1	-
Chlorobenzene	<0.1	<1	-
Bromoform	<0.1	<1	-
cis-1,4-dichloro-2-butene	<1	<1	-
Styrene (Vinyl benzene)	<0.1	<1	-
1,1,2,2-tetrachloroethane	<0.1	<1	-
1,2,3-trichloropropane	<0.1	<1	-
trans-1,4-dichloro-2-butene	<1	<1	-
Isopropylbenzene (Cumene)	<0.1	<1	-
Bromobenzene	<0.1	<1	-
n-propylbenzene	<0.1	<1	-
2-chlorotoluene	<0.1	<1	-
4-chlorotoluene	<0.1	<1	-
1,3,5-trimethylbenzene	<0.1	<1	-
tert-butylbenzene	<0.1	<1	-
1,2,4-trimethylbenzene	<0.1	<1	-
sec-butylbenzene	<0.1	<1	-
1,3-dichlorobenzene	<0.1	<1	-
1,4-dichlorobenzene	<0.1	<1	-
p-isopropyltoluene	<0.1	<1	-
1,2-dichlorobenzene	<0.1	<1	-
n-butylbenzene	<0.1	<1	-
1,2-dibromo-3-chloropropane	<0.1	<1	-
1,2,4-trichlorobenzene	<0.1	<1	-
Naphthalene	<0.1	<1	-
Hexachlorobutadiene	<0.1	<1	-
1,2,3-trichlorobenzene	<0.1	<1	-

TABLE E
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: Ref No:13585/4)

Sample Location	Depth (m)	METAL (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	NICKEL	ZINC	ZINC	CEC (cmol/kg)	pH
Stage 2 CA -Test results (Ref: 13585/3-AA, Sepetmber 2016)*													
HA1	0-0.15	9	1.1	22	41	350	0.17	73			**520**	12	7.4
HA2	0-0.15	<3	<0.3	5.1	17	58	0.05	5.2			83	-	-
HA2	0.5-0.8	6	1.6	13	56	380	0.55	39			**650**	9.9	7.3
HA2	1.0-1.3	6	0.6	8.9	27	410	0.39	31			**600**	11	7.1
HA3	0.03-0.15	<3	0.5	4.8	55	10	0.05	57			35	18	8.4
HA4	0.03-0.15	5	0.6	8.3	68	130	0.13	11			120	13	8.5
ACA test results (April 2018)													
HA5	0.0-0.15	5	0.8	12	65	500	0.25		7	390		20	7.2
HA6	0.1-0.25	4	<0.3	6.6	23	69	0.1		4.5		40	-	-
HA7	0.05-0.3	<3	0.3	8.3	70	21	<0.05	57			35	20	6.6
HA8	0.0-0.15	6	0.3	19	27	110	<0.05		16		110	-	-
HA9	0.2-0.35	33	0.8	10	23	160	0.16		76		200	5.3	7.6
Limit of Reporting (LOR)		3	0.3	0.3	0.5	1	0.05	0.5		0.5	0.5	0.02	-
Procedure D [a] (Normal Distribution)													
Number of Samples		11	11	11	11	11	11	11			11		
Mean [b]		7.5	0.7	10.7	43	200	0.18	34			253		
Standard Deviation		8.6	0.4	5.5	20.4	175.8	0.2	27.7			240		
Coefficient of Variance		1.1	0.6	0.5	0.5	0.9	0.9	0.8			1		
95% Upper Confidence Limits (UCL)		*12*	*0.9*	*14*	*54*	*296*	*0.3*	*49*			*384*		
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)													
Health-based Investigation Levels (HIL) B - Residential B [c]		500	150	500 [e]	30000	1200	30 [f]	1200	400	60000	60000		
Ecological Investigation Levels (EIL) - Urban residential [d]		100 [g]	-	400 [h]	115	1100 [i]	-	270#/170*	40	770#	520*		

Notes: a: Contaminated Sites: "Sampling Design Guidelines", 1995, EPA

b: For statistical purposes, any concentrations less than LOR are assumed equal to LOR.

c: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

d: EIL of aged chromium(III), nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=5.3 cmolc/kg & pH=6.6; the assumed clay content=10 % were selected for derivation of EIL; a conservative approach.

* EIL of aged chromium(III), nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=9.9 cmolc/kg & pH=7.1; the assumed clay content=10 % were selected for derivation of EIL; a conservative approach.

EIL of aged chromium(III), nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=20 cmolc/kg & pH=7.4; the assumed clay content=10 % were selected for derivation of EIL; a conservative approach.

e: Chromium (VI)
f: Methyl Mercury
g: Generic EIL for aged arsenic
h: Chromium (III)
i: Generic added contaminant limit for aged lead + ambient background concentration; old NSW suburb with .

TABLE F
TOTAL RECOVERABLE HYDROCARBONS (TRH) AND BTEX TEST RESULTS
DISCRETE SAMPLES
(Ref No: Ref No:13585/4)

													NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)															
			TRH (mg/kg)					BTEX (mg/kg)					Health Screening Levels (HSL) B High 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
HA5	0.0-0.15	Silt	<25	<25	<25	150	<120	<0.1	<0.1	<0.1	0.8		40	230	0.6	390	NL	95	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
HA6	0.1-0.25	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	-	-	-	-	-	-	-	-
HA7	0.05-0.3	Sand	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3		45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
HA8	0.0-0.15	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	-	-	-	-	-	-	-	-
HA9	0.2-0.35	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	-	-	-	-	-	-	-	-
Limit of Reporting (LOR)			25	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

TABLE G
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TEST RESULTS
DISCRETE SAMPLES
(Ref No: Ref No:13585/4)

			PAH (mg/kg)				NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
							Health-based Investigation Levels (HIL) B[a] Residential B		Health Screening Level (HSL) B - High 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)
Stage 2 CA -Test results (Ref: 13585/3-AA, Sepetmber 2016)*											
HA1	0-0.15	silt	2.1	15	<0.1	**1.5**	4	400	4	170	0.7
HA2	0-0.15	silt	0.6	3.6	<0.1	0.4	4	400	4	170	0.7
HA2	0.5-0.8	silt	**19**	120	0.3	**14**	4	400	4	170	0.7
HA2	1.0-1.3	clay	2.8	17	<0.1	**2**	4	400	NL	170	0.7
HA3	0.03-0.15	sand	<0.3	<0.8	<0.1	<0.1	4	400	3	170	0.7
HA4	0.03-0.15	sand	**12**	69	0.2	**8.8**	4	400	3	170	0.7
ACA test results (April 2018)											
HA5	0.0-0.15	Silt	**9.4**	64	0.1	**6.9**	4	400	4	170	0.7
HA6	0.1-0.25	Silt	<0.3	<0.8	<0.1	<0.1	4	400	4	170	0.7
HA7	0.05-0.3	Sand	<0.3	<0.8	<0.1	<0.1	4	400	3	170	0.7
HA8	0.0-0.15	Silt	0.8	4.2	<0.1	0.6	4	400	4	170	0.7
HA9	0.2-0.35	Clay	1	5.9	<0.1	0.7	4	400	5	170	0.7
Procedure D a (Normal Distribution)											
Number of Samples			11	11	11	11					
Mean b			4.4	27.4	0.1	3.2					
Standard Deviation			6.3	39.5	0.1	4.6					
Coefficient of Variance			1.4	1.4	0.5	1.5					
95% Upper Confidence Limits (UCL)			*8*	*49*	*0.2*	*6*					
Limit of Reporting (LOR)			0.3	0.8	0.1	0.1					

Notes:
a: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
b: For statistical purposes, any concentrations less than LOR are assumed equal to LOR.
NL: Not Limiting

TABLE H
ORGANOCHLORINE PESTICIDES (OCP), POLYCHLORINATED BIPHENYLS (PCB), CYANIDES & PHENOLS TEST RESULTS
DISCRETE SAMPLES
(Ref No: Ref No:13585/4)

		OCP (mg/kg)										(mg/kg)	(mg/kg)	(mg/kg)
Sample Location	Depth (m)	HEXACHLOROBENZENE (HCB)	HEPTACHLOR	ALDRIN+DIELDRIN	ENDRIN	METHOXYCHLOR	MIREX	ENDOSULFAN (alpha, beta & sulphate)	DDD+DDE+DDT	DDT	CHLORDANE (alpha & gamma)	PCB	Cyanides	Phenols
HA5	0.0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1	0.7	<5
HA6	0.1-0.25	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1	<0.5	<5
HA7	0.05-0.3	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1	<0.5	<5
HA8	0.0-0.15	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1	<0.5	<5
HA9	0.2-0.35	<0.1	<0.1	<1.5	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1	<0.5	<5
Limit of Reporting (LOR)		0.1	0.1	0.15	0.2	0.1	0.1	0.5	0.6	0.2	0.2	1	0.5	5
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)														
Health-based Investigation Levels (HIL) B [a] - Residential B		15	10	10	20	500	20	400	600		90	1	250	45000
Ecological Investigation Levels (EIL) - Urban residential										180 [b]				

Notes: a: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

b: Generic EIL for DDT

TABLE I1
VOLATILE ORGANIC COMPOUNDS (VOC) TEST RESULTS - SYSTEMATIC SAMPLING
(Ref No: 13585/4-AA)

Analyte / Sample Location	Depth (m)	VOC (mg/kg)																
		MtBE (Methyl-tert-butyl ether)	Dichlorodifluoromethane (CFC-12)	Chloromethane	Vinyl chloride (Chloroethene)	Bromomethane	Chloroethane	Trichlorofluoromethane	Acetone (2-propanone)	Iodomethane	1,1-dichloroethene	Acrylonitrile	Dichloromethane (Methylene chloride)	Allyl chloride	Carbon disulfide	trans-1,2-dichloroethene	1,1-dichloroethane	Vinyl acetate
HA6	0.1-0.25	<0.1	<1	<1	<0.1	<1	<1	<1	<10	<5	<0.1	<0.1	<0.5	<0.1	<0.5	<0.1	<0.1	<10
HA7	0.05-0.3	<0.1	<1	<1	<0.1	<1	<1	<1	<10	<5	<0.1	<0.1	<0.5	<0.1	<0.5	<0.1	<0.1	<10
HA8	0.0-0.15	<0.1	<1	<1	<0.1	<1	<1	<1	<10	<5	<0.1	<0.1	<0.5	<0.1	<0.5	<0.1	<0.1	<10
Limits of Reporting (LOR)		0.1	1	1	0.1	1	1	1	10	5	0.1	0.1	0.5	0.1	0.5	0.1	0.1	10

TABLE I2
VOLATILE ORGANIC COMPOUNDS (VOC) TEST RESULTS - SYSTEMATIC SAMPLING
(Ref No: 13585/4-AA)

Analyte / Sample Location	Depth (m)	VOC (mg/kg)																
		MEK (2-butanone)	cis-1,2-dichloroethene	Bromochloromethane	Chloroform	2,2-dichloropropane	1,2-dichloroethane	1,1,1-trichloroethane	1,1-dichloropropene	Carbon tetrachloride	Dibromomethane	1,2-dichloropropane	Trichloroethene (Trichloroethylene - TCE)	2-nitropropane	Bromodichloromethane	MIBK (4-methyl-2-pentanone)	cis-1,3-dichloropropene	trans-1,3-dichloropropene
HA6	0.1-0.25	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<0.1	<1	<0.1	<0.1
HA7	0.05-0.3	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<0.1	<1	<0.1	<0.1
HA8	0.0-0.15	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<0.1	<1	<0.1	<0.1
Limits of Reporting (LOR)		10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	10	0.1	1.0	0.1	0.1

TABLE I3
VOLATILE ORGANIC COMPOUNDS (VOC) TEST RESULTS - SYSTEMATIC SAMPLING
(Ref No: 13585/4-AA)

Analyte / Sample Location	Depth (m)	VOC (mg/kg)																
		1,1,2-trichloroethane	1,3-dichloropropane	Chlorodibromomethane	2-hexanone (MBK)	1,2-dibromoethane (EDB)	Tetrachloroethene (Perchloroethylene,PCE)	1,1,1,2-tetrachloroethane	Chlorobenzene	Bromoform	cis-1,4-dichloro-2-butene	Styrene (Vinyl benzene)	1,1,2,2-tetrachloroethane	1,2,3-trichloropropane	trans-1,4-dichloro-2-butene	Isopropylbenzene (Cumene)	Bromobenzene	n-propylbenzene
HA6	0.1-0.25	<0.1	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1
HA7	0.05-0.3	<0.1	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1
HA8	0.0-0.15	<0.1	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1
Limits of Reporting (LOR)		0.1	0.1	0.1	5	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.1	0.1	0.1

TABLE I4
VOLATILE ORGANIC COMPOUNDS (VOC) TEST RESULTS - SYSTEMATIC SAMPLING
(Ref No: 13585/4-AA)

Analyte / Sample Location	Depth (m)	VOC (mg/kg)															
		2-chlorotoluene	4-chlorotoluene	1,3,5-trimethylbenzene	tert-butylbenzene	1,2,4-trimethylbenzene	sec-butylbenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	p-isopropyltoluene	1,2-dichlorobenzene	n-butylbenzene	1,2-dibromo-3-chloropropane	1,2,4-trichlorobenzene	Naphthalene	Hexachlorobutadiene	1,2,3-trichlorobenzene
HA5	0.0-0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA6	0.1-0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA7	0.05-0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA8	0.0-0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA9	0.2-0.35	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Limits of Reporting (LOR)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

TABLE J
ASBESTOS TEST RESULTS
DISCRETE SAMPLES
(Ref No: Ref No:13585/4)

Sample Location	Depth (m)	ASBESTOS (% w/w)	
Soil Sample		ACM (>7mm)	AF/FA (<7mm)
HA5	0.0-0.15	<0.01	<0.001
HA6	0.1-0.25	<0.01	<0.001
HA7	0.05-0.3	<0.01	<0.001
HA8	0.0-0.15	<0.01	<0.001
HA9	0.2-0.35	<0.01	<0.001
Limit of Reporting (LOR)		0.01	0.001
Fibro-cement Piece			
HA5 FCP		ACM	

Notes: ACM: Asbestos Containing Material
AF: Asbestos Fine
FA: Fibrous Asbestos

TABLE K

WASTE CLASSIFICATION OF SOIL - AT THE VICINITY OF LOCATION OF CONCERN (HA5) AS INDICATED ON THE DRAWING No 13585/4-AA2)
(SPECIAL WASTE-ASBESTOS WASTE)
(Ref No: 135885/4-AA)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum Concentration	CT1	CT2	SCC1	SCC2	95%UCL / Concentr	TCLP1	TCLP2	
Metals									
Arsenic	33	100	400	500	2000	ND	5	20	General Solid Waste **
Cadmium	1.6	20	80	100	400	ND	1	4	General Solid Waste **
Chromium (VI)	22*	100	400	1900	7600	ND	5	20	General Solid Waste **
Lead	500	100	400	1500	6000	0.11	5	20	General Solid Waste **
Mercury	0.55	4	16	50	200	ND	0.2	0.8	General Solid Waste **
Nickel	76	40	160	1050	4200	0.083	2	8	General Solid Waste **
[a]							[h]		
Total Petroleum Hydrocarbons									
C6-C9	<20	650	2600	650	2600	NA	NA	NA	General Solid Waste **
C10-C36	440	10000	40000	10000	40000	NA	NA	NA	General Solid Waste **
Benzene	1	10	40	18	72	ND	0.5	2	General Solid Waste **
Toluene	1	288	1152	518	2073	ND	14.4	57.6	General Solid Waste **
Ethyl Benzene	1	600	2400	1080	4320	ND	30	120	General Solid Waste **
Xylenes	3	1000	4000	1800	7200	ND	50	200	General Solid Waste **
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	6.9	0.8	3.2	10	23	0.001	<0.1	0.16	General Solid Waste **
Total PAH	64	200	800	200	800	NA	NA	NA	General Solid Waste **
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid Waste **
Scheduled Chemicals	<50 2	<50	<50	<50	<50	NA	NA	NA	General Solid Waste **
Asbestos	Asbestsos-containing material (ACM) found								Asbestos Waste

NOTES:

ND:	Not Determined
NA:	Not Applicable
UCL:	Upper Confidence Limit
TCLP:	Toxicity Characteristic Leaching Procedure
1:	Includes alpha, beta Endosulfan and Endosulfan Sulphate
2:	Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, HCB & Isodrin
CT1:	Contaminant concentration for defining General Solid Waste (without TCLP)
CT2:	Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1:	Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2:	Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1:	Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2:	Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*:	Reported as Total Chromium
**:	Non-putrescible

APPENDIX A

TABLE 1 – BOREHOLE LOGS

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Development**	**Job No**	**13585/4**
Location	**Corner Victoria Road, Day, Formosa and Thornley Streets**	**Refer to Drawing No**	**13585/4-AA1**
	Drummoyne	**Logged & Sampled by**	**JH**

TABLE 1

Sample	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
HA5	0-0.4	0-0.15	03/04/2018		FILL: Clayey Silt, low plasticity, grey-brown, inclusion of gravel	FCP collected
	0.4 -				Refusal on bedrock	
HA6	0-0.1	NS	03/04/2018		CONCRETE HARDSTAND	
	0.1-0.25				FILL: Clayey Silt, low plasticity, grey-brown, inclusion of gravel	
	0.25-				Refusal on Sandstone	
HA7	0-0.05	NS	03/04/2018		BITUMEN HARDSTAND	
	0.05-0.3	0.05-0.2			FILL: Gravelly Sand, medium to coarse-grained, brown-dark grey, well graded	
	0.3-				Refusal on Bedrock	
HA8	0-0.2	0-0.15	03/04/2018		FILL: Clayey Silt, low plasticity, grey-brown, inclusion of gravel	
	0.2-				Refusal on bedrock	
HA9	0-0.2		03/04/2018		CONCRETE HARDSTAND	
	0.2-0.6	0.2-0.35			FILL: Silty Clay, medium plasticity, brown, with gravel	
	0.6-				Refusal to hand auger	

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

WORKCOVER RECORDS FOR DANGEROUS GOODS

NSW GOVERNMENT
WorkCover

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
Customer Service Centre 13 10 50
DX 731 Sydney workcover.nsw.gov.au

RECEIVED
05 NOV 2015

Our Ref: D15/170116
Your Ref: Frances Kuipers

2 November 2015

Attention: Frances Kuipers
Geotechnique Pty Ltd
PO BOX 880
Penrith NSW 2750

Dear Ms Kuipers,

RE SITE: Lot 10 DP 625084, Lots 1, 2, & 10 Section 6 DP 862 Drummoyne NSW

I refer to your site search request received by WorkCover NSW on 16 October 2015 requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Brent Jones
Senior Licensing Officer
Dangerous Goods Team

NSW GOVERNMENT | WorkCover

WorkCover NSW
92–100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
Customer Service Centre 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D15/170116
Your Ref: Frances Kuipers

2 November 2015

Attention: Frances Kuipers
Geotechnique Pty Ltd
PO BOX 880
Penrith NSW 2750

Dear Ms Kuipers,

RE SITE: Lots 6, 7, 8, DP 136422 & Lot 9 Section 6 DP 862 Drummoyne NSW

I refer to your site search request received by WorkCover NSW on 16 October 2015 requesting information on licences to keep dangerous goods for the above site.

Enclosed are copies of the documents that WorkCover NSW holds on Dangerous Goods Licence 35/009550 relating to the storage of dangerous goods at the above-mentioned premises, as listed on the Stored Chemical Information Database (SCID).

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Brent Jones
Senior Licensing Officer
Dangerous Goods Notification Team

AUSTRALIAN PETROLEUM INSTALLATON Pty Ltd

ACN. 060 048
P.O. BOX 454, NEWPORT, NSW. 2106.
Ph: 0412 294 212 Fax: (02) 9918 2590.
ozpetins@aol.com.au

N.S.W. Ambulance Station,
74 Carlton Crescent,
SUMMER HILL. NSW.

6th September, 1999.

Att: Mr. P. Tedesco.

CERTIFICATE OF ABANDONMENT.

We certify that we have abandoned the existing 10,000l fuel storage tank at Victoria Road, DRUMMOYNE STATION, via sand fill method, in accordance with AS 1940.

Further, the dispensing pump has been removed and the electrical supply disconnected.

D. McKenzie.
A.P.I.

WorkCover New South Wales, 400 Kent Street, Sydney 2000 Telephone 9370 5000 ALL MAIL TO LOCKED BAG 10, CLARENCE STREET SYDNEY 2000

WORKCOVER
NEW SOUTH WALES

APPLICATION FOR RENEWAL

OF LICENCE TO KEEP DANGEROUS GOODS

ISSUED UNDER AND SUBJECT TO THE PROVISIONS OF THE DANGEROUS GOODS ACT, 1975 AND REGULATION THEREUNDER

DECLARATION: *Please renew licence number 35/009550 to 1999. I confirm that all the licence details shown below are correct (amend if necessary).*

S Cbfarrell ..... S E HARROLD 12/05/98

(Signature) *(Please print name)* *(Date signed)*

for: AMBULANCE SERVICE OF NSW

*THIS **SIGNED** DECLARATION SHOULD BE **RETURNED TO:***

WorkCover New South Wales
Dangerous Goods Licensing Section (Level 3)
Locked Bag 10
P O CLARENCE STREET 2000

Enquiries: ph (02) 9370 5187
fax (02) 9370 6105

Details of licence on 29 April 1998

Licence Number 35/009550 **Expiry Date** 26/06/98

Licensee AMBULANCE SERVICE OF NSW
~~South Eastern & Central Sydney~~ Level 1, 5-9 Butler Rd Hurstville 2220
Postal Address ~~BOX 105 P O, ROZELLE 2039~~
Licensee Contact ~~D I Stan Harold~~ Ph. ~~9282 0920~~ SUPT. E. MARKS PH 95803106

Premises Licensed to Keep Dangerous Goods
53 VICTORIA RD
DRUMMOYNE 2047

Nature of Site AMBULANCE SERVICES **Major Supplier of Dangerous Goods** NOT APPLICABLE

Emergency Contact for this Site Co-ordination Supervisor x 114 ph. 9282 0920

Site staffing 24 HRS 7 DAYS

Details of Depots

Depot No.	Depot Type	Goods Stored in Depot	Qty
C914	UNDERGROUND TANK	Class 3	12000 L
		UN 1203 PETROL	12000 L

Please renew licence renewed to

THE NEW SOUTH WALES GOVERNMENT
Putting people first by managing better

PART A

WorkCover Authority

LICENCE TO KEEP DANGEROUS GOODS

(Dangerous Goods Act 1975)

Application for new licence, amendment or transfer

Expiry: 26.6.96

1. Name of applicant — ACN

AMBULANCE SERVICE OF NSW

2. Site to be licensed — delete (F3)

No: 53 | Street: ~~DRUMMOYNE AMB. STATION~~ VICTORIA RD

Suburb/Town: DRUMMOYNE SYDNEY | Postcode: 2047

3. Previous licence number (if known) 35/009550

4. Nature of site: AMBULANCE STATION ~~815~~

SCIENTIFIC SERVICES TRANS... 1994 DANGEROUS GOODS

5. Emergency contact on site:

Phone: 2820920 | Name: D/I STAN HAROLD

6. Site staffing: Hours per day: 24 hrs | Days per week: 7 days

7. Major supplier of dangerous goods

8. If new site or significant modification
Plan stamped by: Accredited consultant's name:

DATA Date stamped 27 OCT 1994 ENTERED

9. Number of dangerous goods depots at site

10. Trading name or occupier's name

AMBULANCE SERVICE OF NSW

11. Postal address of applicant — Suburb/Town — Postcode

P.O. BOX 105 ROZELLE | ~~SYDNEY~~ Rozelle | 2039

12. Contact for licence enquiries:

Phone: 2820920 | Fax: | Name: D/I STAN HAROLD

I certify that the details contained in this application (or the accompanying computer disk) are true and correct

13. Signature of applicant: G Malone | Date: 12.10.94

OCT 1994

Please complete attached site sketch, depot listing and check sheet (if required) and return to WorkCover Authority in envelope provided.

Form DG1

PART

Complete 1 section per depot

CHEMICAL STORAGE 35/009550

If you have more depots than the space provided, photocopy sufficient sheets first.

Change 1+2

Depot number	Type of depot	Class	Licensed maximum storage capacity
C914	Underground tank.	3.	12,000 L.

UN number	Shipping name	Class	Pkg. Group	EPG	Product or common name	Typical quantity	Unit eg. L, kg, m^3
1203	~~The Shell Company of Aust Ltd~~	3	II	Yes	~~Shell~~	12000	L
	PETROL				UNLEADED PETROL		

Depot number	Type of depot	Class	Licensed maximum storage capacity

UN number	Shipping name	Class	Pkg. Group	EPG	Product or common name	Typical quantity	Unit eg. L, kg, m^3

Depot number	Type of depot	Class	Licensed maximum storage capacity

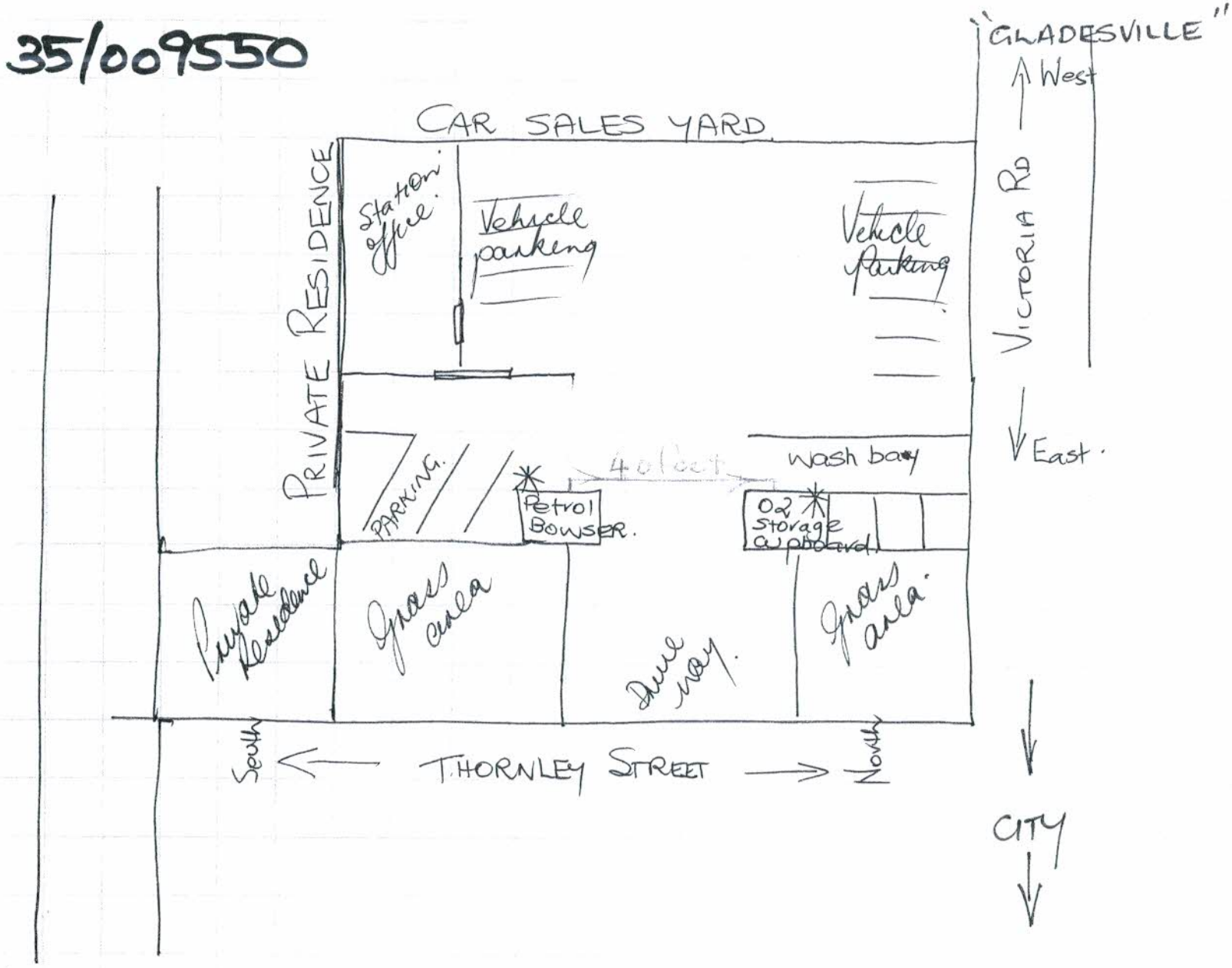
UN number	Shipping name	Class	Pkg. Group	EPG	Product or common name	Typical quantity	Unit eg. L, kg, m^3

Depot number	Type of depot	Class	Licensed maximum storage capacity

UN number	Shipping name	Class	Pkg. Group	EPG	Product or common name	Typical quantity	Unit eg. L, kg, m^3

Site Sketch

Please carefully read the instructions in Part B of the guide before sketching the site.



PART B

Application is hereby made for—*a licence (or amendment of the licence) / DG 8 2006
*the transfer of the licence
for the keeping of dangerous goods in or on the premises described below.

(*delete whichever is not required)

FEE: $10.00 per Depot

\ 4

Name of Applicant in full (see over)	Department of Health, N.S.W., Surname Central District Given Names Ambulance Service. 1459 CC/106/03 03A
Trading name or occupier's name (if any)	Central District Ambulance Service
Postal address	93 Quay St Dt. N Sydney. Postcode 2000
Telephone number of applicant	STD Code 02 Number 212 4555
Address of the premises in or on which the depot or depots are situated (including street number, if any)	Ambulance Stn. Victoria Rd, Drummoyne Postcode 2047.
Nature of premises (see over)	

PLEASE ATTACH SITE PLAN

Particulars of type of depots and maximum quantities of dangerous goods to be kept at any one time.

Depot number	Type of depot (see over)	Storage capacity	Dangerous goods DD001 020 0 Product being stored	C & C Office use only
1	Underground	12 000 L	PETROL	2 020 14
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Name of company supplying flammable liquid (if any) Central District Ambulance

Have premises previously been licensed? No

If known, state name of previous occupier New Building. Licence No. 9550

Signature of applicant J Chapple Date 31.3.83

Metropolitan Superintendent.

For external explosives magazine(s), please fill in side 2.

FOR OFFICE USE ONLY

CERTIFICATE OF INSPECTION

I, Pete Jones being an Inspector under the Dangerous Goods Act, 1975, do hereby certify that the premises described above do comply with the requirements of the Dangerous Goods Act, 1975, and the Dangerous Goods Regulation with regard to their situation and construction for the keeping of dangerous goods of the nature and in the quantity specified.

Signature of Inspector P Jones

me of Occupier n full	HEALTH COMMISSION OF N.S.W. - CENTRAL DISTRICT (Surname/s) (First Names in full)
ding Name (if any)	
tal Address	Box C39, P.O., CLARENCE STREET Postcode 2000
dress of the mises in which the ot or depots are ated	Ambulance Station, Victoria Road, DRUMMOYNE Postcode 2047
cupation	ambulance service
ure of Premises	ambulance station

ticulars of construction of depots and maximum quantities of inflammable liquid and/or dangerous goods to be kept ny one time.

PLEASE SKETCH SITE ON BACK OR ATTACH PLAN

nk r pot mber	Construction of depots *			Inflammable Liquid		Dangerous Goods						
	Walls	Roof	Floor	Mineral spirit litres	Mineral oil litres	Class 1 litres	Class 2 litres	Class 3 kg	Class 4 m^3	Class 5A# litres	Class 5B# litres	Class 9 litres
1	Underground Tank			2500								
2												
3												
4												
5												
6												
7												
8												
9												
10												
	TOTAL											

* If kept in tanks describe depots as underground or aboveground tanks.

\# Insert water capacity of tanks or cylinders.

lame of Company supplying inflammable liquid _____

lave premises previously been licensed? YES Licence No. A 9550 - 6

f known, state name of previous occupier NSW Ambulance Transport Service- Central District

Signature of applicant J Lynch. Date 25/3/80

R OFFICE USE ONLY:

Insp. Metrop

CERTIFICATE OF INSPECTION

ADLY NOUR being an Inspector under the

nflammable Liquid Act, 1915, do hereby certify that the premises or store described above does comply with the equirements of that Act and regulations with regard to its situation and construction for the keeping of inflammable quid and/or dangerous goods in quantity and nature specified.

Dangerous Goods Branch
Box 846, P.O.
DARLINGHURST 2010
(6th Floor, 1 Oxford Street, Sydney)

Signature of Inspector _____

Date 25.3.80

31-5-65

EXPLANATORY

Inflammable Liquid—

Mineral Oil—includes kerosene, mineral turpentine and white spirit (for cleaning), and compositions containing same.
Mineral Spirit—includes petrol, benzene, benzolene, benzol and naphtha, and compositions containing same.

Dangerous Goods—

Class 1.—Acetone, amyl acetate, butyl acetate, carbon bisulphide; any combination of substances of an inflammable character suitable for use as an industrial solvent and having a true flashing point of less than 73 degrees Fahrenheit.

Class 2.—Nitro-cellulose (also known as "pyroxylin" and "collodion cotton") moistened with an alcohol, butyl alcohol (also known as "butanol"), methylated spirits, vegetable turpentine; and any liquid or solid containing methylated spirits, having a true flashing point of less than 150 degrees Fahrenheit.

Class 3.—Nitro-cellulose product.

Class 4.—Compressed or dissolved acetylene contained in a porous substance.

DIRECTIONS

1. Applications must be forwarded to the Chief Inspector of Inflammable Liquid, Explosives Department, No. 16 Grosvenor Street, Sydney (Box 48, G.P.O.), and must be accompanied by the prescribed fee, as set out hereunder:—

Registration of Premises (Fee £1 10s. 0d. p.a.).—For quantities not exceeding 300 gallons of mineral oil and 100 gallons of mineral spirit, if kept together; or 800 gallons of mineral oil and 100 gallons of mineral spirit, if kept in separate depots; or 500 gallons of mineral spirit, if kept in an underground tank depot; or 800 gallons of mineral oil and 500 gallons of mineral spirit, if mineral spirit is kept in an underground tank depot.

In addition to, or in lieu of the above, similar quantities of Dangerous Goods of Classes 1 and 2 may be kept under the like conditions; reading Dangerous Goods of Class 1 for the words Mineral Spirit and Dangerous Goods of Class 2 for the words Mineral Oil.

Store License, Div. A (Fee, £3 5s. 0d. p.a.).—For quantities in excess of those stated above, but not exceeding 4,000 gallons mineral oil and/or mineral spirit, and/or Dangerous Goods of Classes 1 and 2.

Store License, Div. B (Fees, See Regulation 7).—For quantities exceeding 4,000 gallons of mineral and/or mineral spirit, and/or dangerous goods of Classes 1 and 2, and/or dangerous goods of Class 3.
For the keeping of Dangerous Goods of Classes 3 and/or 4. **(£7 10s. 0d. p.a.).**

2. The certificate of inspection at foot hereof must be signed by an Inspector under the Inflammable Liquid Act, 1915 (as amended), or Police Officer, or other officer duly authorised in that behalf, and where the premises are situated outside the Metropolitan Area of Sydney, it is requested that such certificate be obtained prior to forwarding application.

1. Name in full of occupier ... ... Central District Ambulance Service

2. Occupation ... ...

3. Locality of the premises in which the depot or depots are situated ... No. or Name
Street Victoria Road
Town Drummoyne

4. Nature of premises (Dwelling, Garage, Store, etc.) ... ...

5. Will mineral spirit be kept in a prescribed underground tank depot?

6. Particulars of construction of depots and maximum quantities of inflammable liquid and/or Dangerous Goods to be kept at any one time.

Depot No.	Construction of Depots			Inflammable Liquid		Dangerous Goods			
	Walls	Roof	Floor	Mineral Spirit Gallons	Mineral Oil Gallons	Class 1 Gallons	Class 2 Gallons	Class 3 lb.	Class 4 cub. ft.
1	Underground		Tanks	500					
2									
3									
4									
5									
6									
7									
8									
9									
10					See letter 62/205 re Mobil as to the effect of form B				

Signature of Applicant 93-105 Drummoyne Rd Sydney

Date of Application _____ 19 Postal Address

CERTIFICATE OF INSPECTION

I, Raymond G. Allison being an Inspector under the Inflammable Liquid Act, 1915 (as amended), do hereby certify that the premises or store herein referred to and described is suitable with regard to its situation and construction for the safe keeping of inflammable liquid and/or dangerous goods in quantity and nature specified.

Place Sydney Signature of Inspector R.G. Allison

Date 10-4-63

[PLEASE TURN OVER

INSPECTION RECORD

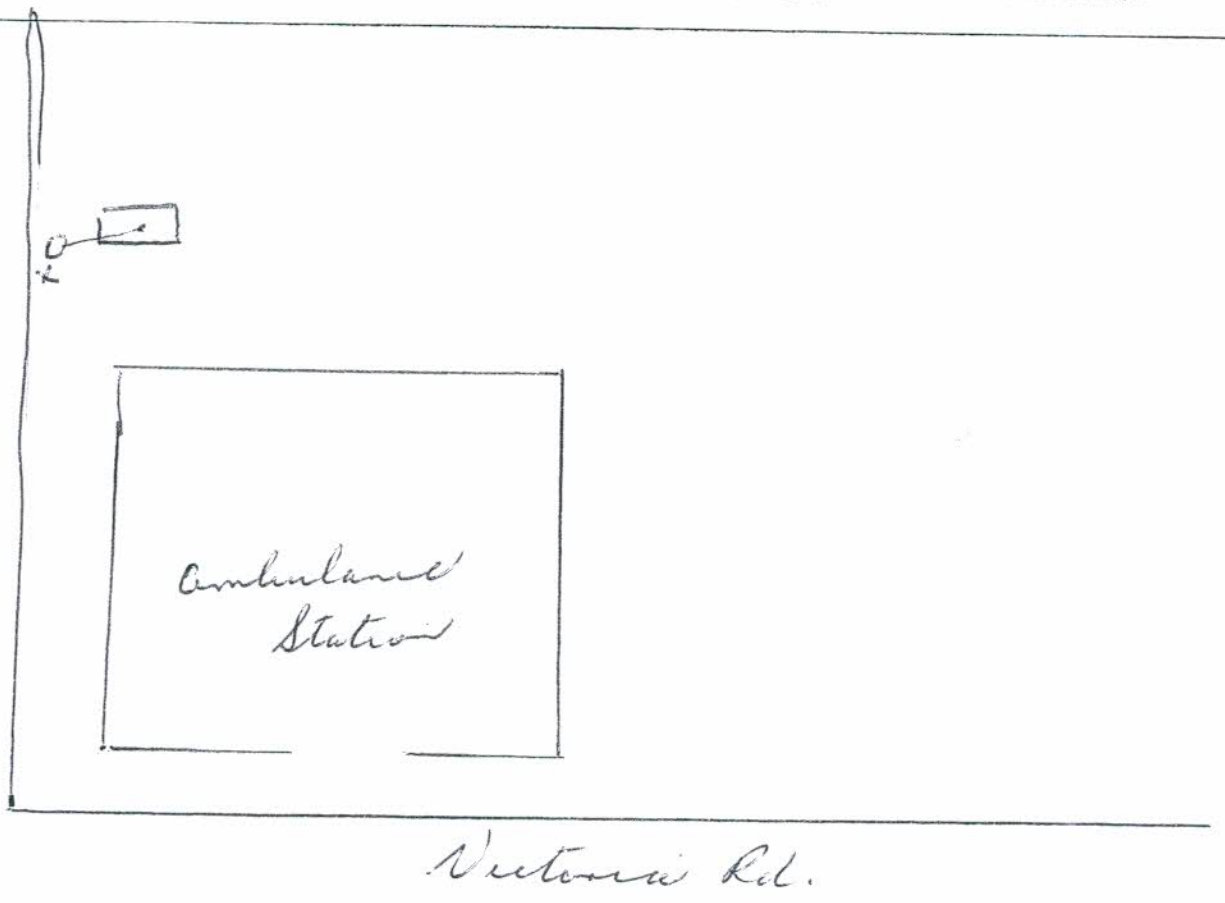
Licence No. C 9550

Licensee: Central District Ambulance Service

Address: Victoria Road, Drummoyne.

Storage licensed: 1/500.

Sketch of Premises (Dimensions of depot and distance of same from adjoining "protected works" to be shown).



Inspected	Initials	Requisitions made or state of depot
10-9-63	Klb	Sat.

...he Inflammable Liquid Act, 1915–31, for the year ending 30th June, 19 39

Inflammable Liquid—

EXPLANATORY.

Mineral Oil—includes kerosene, mineral turpentine and white spirit (for cleaning), and compositions containing same.

Mineral Spirit—includes petrol, benzine, benzolene, benzol and naphtha, and compositions containing same.

Dangerous Goods—

Class I.—Acetone, amylacetate, butylacetate, carbon bi-sulphide; any combination of substances of an inflammable character, other than ether alcohol, used as a solvent for nitro-cellulose or other cellulose compound, having a true flashing point of less than 73 degrees Fahrenheit.

Class II.—Nitro-cellulose, moistened with an alcohol, methylated spirits, vegetable turpentine and turpentine substitutes (other than inflammable liquid); any liquid or solid containing methylated spirits, having a true flashing point of less than 150 degrees Fahrenheit.

Class III.—Nitro-cellulose product and celluloid.

Class IV.—Compressed or dissolved acetylene contained in a porous substance.

DIRECTIONS.

1. Applications must be forwarded to the Chief Inspector of Inflammable Liquid, Explosives Department, Department of Mines, Bridge-street, Sydney, and must be accompanied by the statutory fee, as set out hereunder:—

REGISTRATION OF PREMISES (FEE, 10s.).—For quantities not exceeding 300 gallons of mineral oil and 100 gallons of mineral spirit, if kept together; or 800 gallons of mineral oil and 100 gallons of mineral spirit, if kept in separate depots; or 500 gallons of mineral spirit, if kept in an underground tank depot; or 800 gallons of mineral oil and 500 gallons of mineral spirit, if mineral spirit is kept in an underground tank depot.

In addition to, or in lieu of the above, similar quantities of Dangerous Goods of Classes 1 and 2 may be kept; reading Dangerous Goods of Class 1 for the words Mineral Spirit and Dangerous Goods of Class 2 for the words Mineral Oil.

STORE LICENSE, DIV. A (FEE, £1).—For quantities in excess of those stated above, but not exceeding 4,000 gallons mineral oil and/or mineral spirit, and/or Dangerous Goods of Classes 1 and 2.

STORE LICENSE, DIV. B (FEE, £2).—For quantities exceeding 4,000 gallons of mineral oil and/or mineral spirit, and/or dangerous goods of Classes 1 and 2, and/or dangerous goods of Class 3.

For the keeping of Dangerous Goods of Classes 3 and/or 4.

2. The certificate of inspection at foot hereof must be signed by an Inspector under the Inflammable Liquid Act, 1915-1931, or Police Officer, or other officer duly authorised in that behalf, and where the premises are situated outside the Metropolitan Area it is requested that such certificate be obtained prior to forwarding application.

1. Name in full of occupier	New South Wales Ambulance Transport Service
2. Occupation	Ambulance Transport Ser
3. Locality of the premises in which the depot or depots are situated	No. or Name CENTRAL DISTRICT AMBULANCE
	Street Victoria Road
	Town Drummoyne
4. Nature of premises (Dwelling, Garage, Store, etc.)	Ambulance Station
5. Will mineral spirit be kept in a prescribed underground tank depot?	yes
6. Will mineral spirit in quantities exceeding 3 gallons be kept or used for any industrial purpose? (State nature of industry.)	no

7. Particulars of construction of depots and maximum quantities of inflammable liquid and/or Dangerous Goods to be kept at any one time.

Depot No.	Construction of Depots.			Inflammable Liquid.		Dangerous Goods.			
	Walls.	Roof.	Floor.	Mineral Spirit. Gallons.	Mineral Oil. Gallons.	Class 1. Gallons.	Class 2. Gallons.	Class 3. lb.	Class 4. cub. ft.
1	Underground Tank			500					
2									
3									
4									101
5									
6									
7									
8									
9									
10									

Signature of Applicant A Mulcahee

Date of Application 1-12-1938

Postal Address Ambulance Station Victoria Rd Drummoyne Sydney

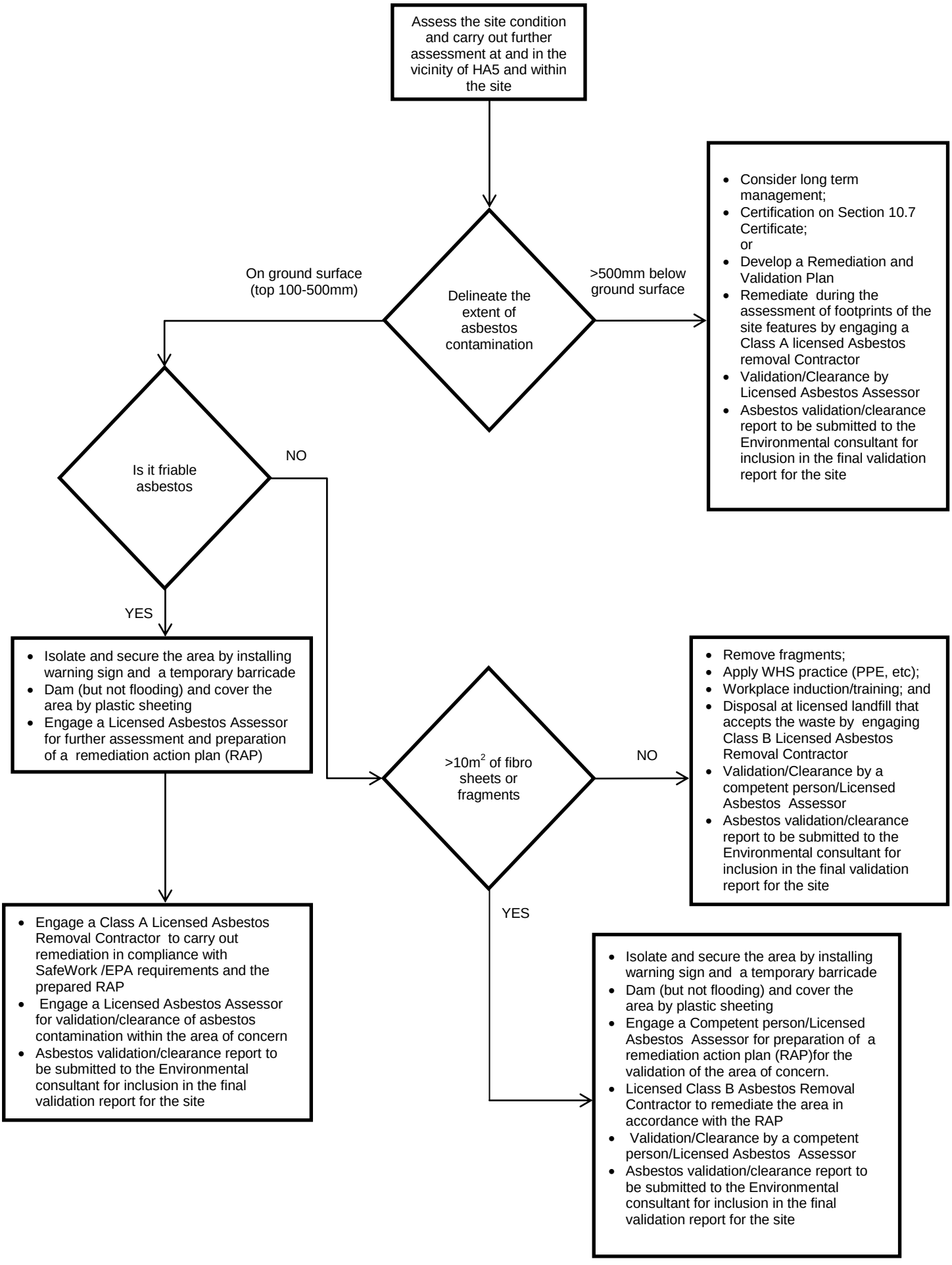
CERTIFICATE OF INSPECTION.

I, William Teague, being an Inspector under the Inflammable Liquid Act, 1915–31, do hereby certify that the premises or store herein referred to and described is suitable with regard to its situation and construction for the safe keeping of inflammable liquid and/or dangerous goods in quantity and

APPENDIX C

FURTHER ASSESSMENT AND VALIDATION/MANAGEMENT OF ASBESTOS CONTAMINATION

ASBESTOS ASSESSMENT CLEARANCE AT AND IN THE VICINITY OF HA5



APPENDIX D

REMEDIAL STRATEGY FOR ABANDONED UNDERGROUND STORAGE TANKS (USTS)

Remediation/validation Strategy - Abandoned Underground Storage Tanks (USTs) and the impacted soil in the vicinity of UST(s)

Remediation goal:

- Remove any USTs within the site as a primary source of contamination or potential contamination and the impacted soil to minimise the risks to human health and the environment (terrestrial ecosystem) under the proposed land use as mixed commercial and residential use.
- Assessment of impacted soil for onsite resuse or offsite dispsoal.
- Validation of the excavated pit after the removal of the USTs and associated features (if any) to make the site suitable for the proposed mixed commercial and residential use.

The RAP is to be implemented, where applicable in accordance with the relevant guidelines including the following:

- NSW Environment Protection Authority (EPA) *Technical Note for Investigation of Service Station Sites* (EPA;2014s);
- The amended *Underground Petroleum Storage Systems Regulations* (EPA 2017);
- the *National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM 1999, April 2013);*
- *Guidelines for Consultants Reporting on Contaminated Sites* (OEH;2011) and
- Managing Land Contamination: Planning Guidelines, State Environmental Planning Policy No. 55 – Remediation of Land (DUAP 1998).
- Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW 2005).

The following remediation works should be carried out in order to achieve the remediation goal for the soil impacted by the presence of the USTs:

- Engagement of Geophysical Suryor (with ground penetrating radar equipent) for locating the UST(s) within the site with the preparation of Safety work method Statements (SWMS).
- Cary out an underground services search to locate the position of any services prior to any excavation works. This should carry out after demolition and removal of aboveground feature including the hardstand/concrete slab (if any).
- Site/Environmental site management plan (Section 15 of this report) to followed for any stormwater, runoff and resulting stockpiles [#] from the vicinity of UST(s).
- If any liquid waste encountered, dispose of at a licensed facility;
- USTs should be degassed (where appropriate) to make safe for removal and transport off-site at the licensed facility.
- Removal of the UST(s) and associated infrastructure (if any encountered) from the excavation by a licensed contractor in accordance with AS 4976-2008.
- Disposal certificate should be forwarded to the environment for inclusion in the final validation report.
- Excavate any remaining contaminated soil from base and walls based on the Photoionization detector (PID) readings. An environmental consultant to be present on site to guide the excavation of potentially contaminated soils.
- Recover the validation soil samples from the excavated pit(s) in accordance with NSW EPA Technical Notes: Investigation for Service Station and as detailed in Section 18.1.3 of this report.

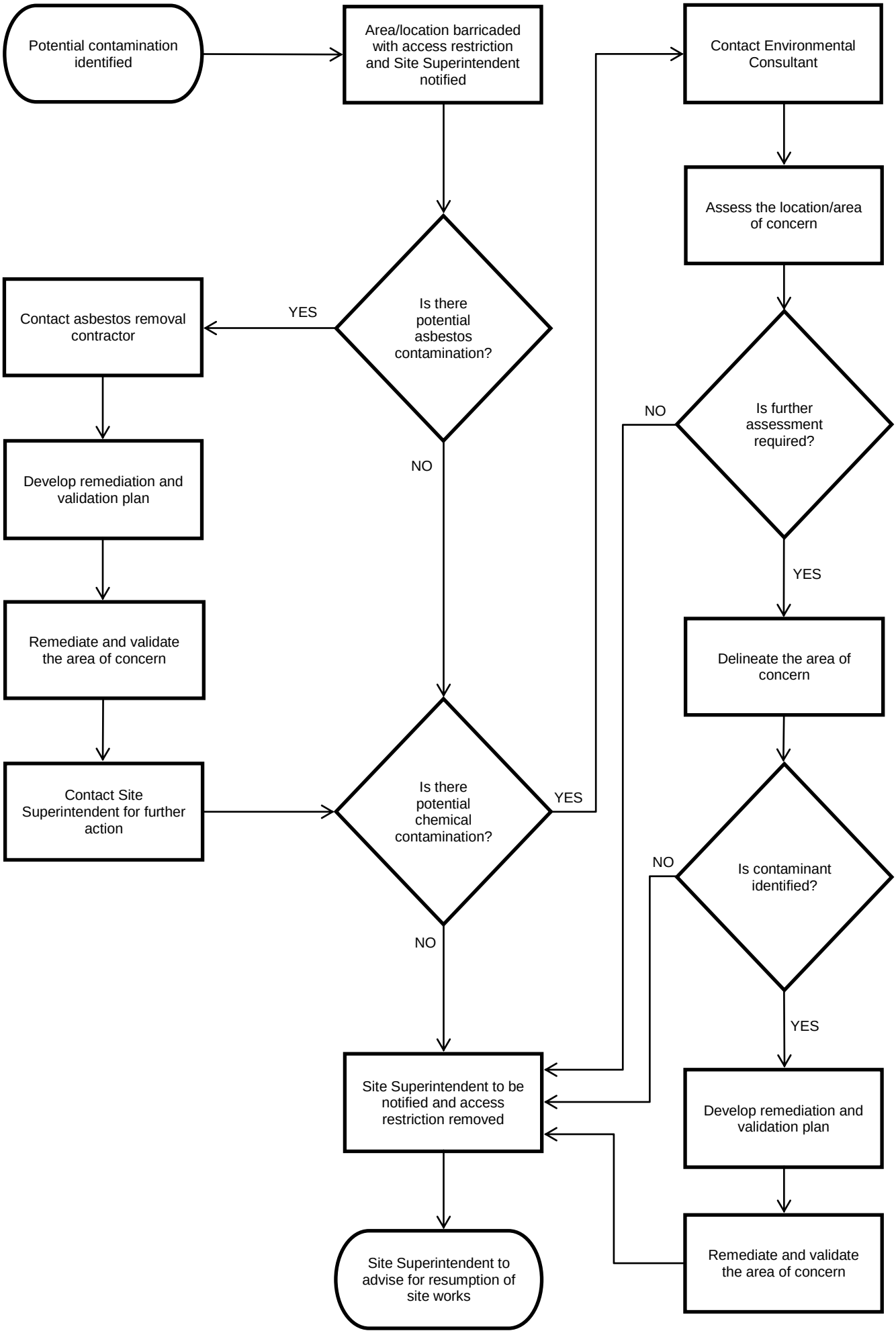
- The excavation will be left open until the final validation results (below the assessment criteria adopted for HIL B and EIL for urban residential in Schedule B1 of NEPM 1999 April 2013), indicating the successful remediation.
- Upon successful remediation of the excavated pit(s) pit, the environmental consultant to prepare a validation letter based on the final validation test results.
- Depending on the extent of soil contamination, temporary shoring (or benching) of the excavation may be required.
- Adequate protection to be provided around the perimeter of the excavation pit that are left open such as temporary fencing or barriers with warning signs such as “deep excavation”, in accordance with WorkCover requirements.
- Assessment of the excavated/stockpiled material for re-use on site, or offsite disposal at a licensed facility with the appropriate waste classification in accordance with NSW EPA *Waste Classification Guidelines Part 1: Classifying Waste (NSW* EPA 2014b).
- Waste disposal dockets should be submitted for inclusion in final validation report the excavated pit(s).
- The resulting excavated pits(s) to be backfilled with the validated excavated soil of imported VENM or ENM.
- Environmental consultant shall make an assessment based on the condition of the Tank(s), nature and extent of any soil impacts to determine the contamination status of groundwater with the installation and sampling of groundwater monitoring wells.

 # It should be noted that the stockpile areas resulting from the excavation of soil surrounding the USTs(s), shall, preferably, be hardstand or by lined base with thick impermeable plastic or within the designated containers. Stockpiles should be covered to prevent dust generation and control potential release of odours. Appropriate site management to control water leaching from the stockpile or during rainfall must be considered. A stockpile management to maintain separate stockpiles for different types and/or sources to avoid missing waste types to determine by sampling and testing.

APPENDIX E

UNEXPECTED FINDS MANAGEMENT PROTOCOL

UNEXPECTED FINDS MANAGEMENT PROTOCOL



APPENDIX F

LABORATORY TEST CERTIFICATES

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne**
Order Number	(Not specified)
Samples	9

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	**SE177567 R0**
Date Received	4/4/2018
Date Reported	11/4/2018

COMMENTS

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

No respirable fibres detected in soil samples using trace analysis technique as per AS 4964-2004.

Asbestos analysed by approved identifiers Ravee Sivasubramaniam.

SIGNATORIES

Akheeqar Beniameen
Chemist

Bennet Lo
Senior Organic Chemist/Metals Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ravee Sivasubramaniam
Hygiene Team Leader

Shane McDermott
Inorganic/Metals Chemist

VOC's in Soil [AN433] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	**0.6**	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	**0.2**	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	**0.8**	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	**0.9**	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	**0.2**	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	<1	<1	<1	-
Chloromethane	mg/kg	1	-	<1	<1	<1	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Bromomethane	mg/kg	1	-	<1	<1	<1	-
Chloroethane	mg/kg	1	-	<1	<1	<1	-
Trichlorofluoromethane	mg/kg	1	-	<1	<1	<1	-
Acetone (2-propanone)	mg/kg	10	-	<10	<10	<10	-
Iodomethane	mg/kg	5	-	<5	<5	<5	-
1,1-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Acrylonitrile	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	<0.5	<0.5	<0.5	-
Allyl chloride	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Carbon disulfide	mg/kg	0.5	-	<0.5	<0.5	<0.5	-
trans-1,2-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,1-dichloroethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Vinyl acetate	mg/kg	10	-	<10	<10	<10	-
MEK (2-butanone)	mg/kg	10	-	<10	<10	<10	-
cis-1,2-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Bromochloromethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Chloroform	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
2,2-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2-dichloroethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,1,1-trichloroethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,1-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Carbon tetrachloride	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Dibromomethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
2-nitropropane	mg/kg	10	-	<10	<10	<10	-
Bromodichloromethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	<1	<1	<1	-
cis-1,3-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
trans-1,3-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,1,2-trichloroethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,3-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Chlorodibromomethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
2-hexanone (MBK)	mg/kg	5	-	<5	<5	<5	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Chlorobenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Bromoform	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	<1	<1	<1	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2,3-trichloropropane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	<1	<1	<1	-

VOC's in Soil [AN433] Tested: 9/4/2018 (continued)

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Isopropylbenzene (Cumene)	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Bromobenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
n-propylbenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
2-chlorotoluene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
4-chlorotoluene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
tert-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
sec-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,3-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,4-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
p-isopropyltoluene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
n-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Hexachlorobutadiene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	<0.1	-
Total VOC*	mg/kg	24	-	<24	<24	<24	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	<3.0	<3.0	<3.0	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	<1.8	<1.8	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	<1.8	<1.8	<1.8	-

VOC's in Soil [AN433] Tested: 9/4/2018 (continued)

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006	Trip Spike TS1 SOIL - 3/4/2018 SE177567.008
Benzene	mg/kg	0.1	<0.1	[110%]
Toluene	mg/kg	0.1	<0.1	[78%]
Ethylbenzene	mg/kg	0.1	<0.1	[100%]
m/p-xylene	mg/kg	0.2	**0.6**	[97%]
o-xylene	mg/kg	0.1	**0.3**	[93%]
Total Xylenes	mg/kg	0.3	**0.9**	-
Total BTEX	mg/kg	0.6	**0.9**	-
Naphthalene	mg/kg	0.1	<0.1	-
Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	-
Chloromethane	mg/kg	1	<1	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	-
Bromomethane	mg/kg	1	<1	-
Chloroethane	mg/kg	1	<1	-
Trichlorofluoromethane	mg/kg	1	<1	-
Acetone (2-propanone)	mg/kg	10	<10	-
Iodomethane	mg/kg	5	<5	-
1,1-dichloroethene	mg/kg	0.1	<0.1	-
Acrylonitrile	mg/kg	0.1	<0.1	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	-
Allyl chloride	mg/kg	0.1	<0.1	-
Carbon disulfide	mg/kg	0.5	<0.5	-
trans-1,2-dichloroethene	mg/kg	0.1	<0.1	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	-
1,1-dichloroethane	mg/kg	0.1	<0.1	-
Vinyl acetate	mg/kg	10	<10	-
MEK (2-butanone)	mg/kg	10	<10	-
cis-1,2-dichloroethene	mg/kg	0.1	<0.1	-
Bromochloromethane	mg/kg	0.1	<0.1	-
Chloroform	mg/kg	0.1	<0.1	-
2,2-dichloropropane	mg/kg	0.1	<0.1	-
1,2-dichloroethane	mg/kg	0.1	<0.1	-
1,1,1-trichloroethane	mg/kg	0.1	<0.1	-
1,1-dichloropropene	mg/kg	0.1	<0.1	-
Carbon tetrachloride	mg/kg	0.1	<0.1	-
Dibromomethane	mg/kg	0.1	<0.1	-
1,2-dichloropropane	mg/kg	0.1	<0.1	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1	-
2-nitropropane	mg/kg	10	<10	-
Bromodichloromethane	mg/kg	0.1	<0.1	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	-
cis-1,3-dichloropropene	mg/kg	0.1	<0.1	-
trans-1,3-dichloropropene	mg/kg	0.1	<0.1	-
1,1,2-trichloroethane	mg/kg	0.1	<0.1	-
1,3-dichloropropane	mg/kg	0.1	<0.1	-
Chlorodibromomethane	mg/kg	0.1	<0.1	-
2-hexanone (MBK)	mg/kg	5	<5	-
1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	-
Chlorobenzene	mg/kg	0.1	<0.1	-
Bromoform	mg/kg	0.1	<0.1	-
cis-1,4-dichloro-2-butene	mg/kg	1	<1	-
Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	-
1,2,3-trichloropropane	mg/kg	0.1	<0.1	-
trans-1,4-dichloro-2-butene	mg/kg	1	<1	-

VOC's in Soil [AN433] Tested: 9/4/2018 (continued)

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006	Trip Spike TS1 SOIL - 3/4/2018 SE177567.008
Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	-
Bromobenzene	mg/kg	0.1	<0.1	-
n-propylbenzene	mg/kg	0.1	<0.1	-
2-chlorotoluene	mg/kg	0.1	<0.1	-
4-chlorotoluene	mg/kg	0.1	<0.1	-
1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	-
tert-butylbenzene	mg/kg	0.1	<0.1	-
1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	-
sec-butylbenzene	mg/kg	0.1	<0.1	-
1,3-dichlorobenzene	mg/kg	0.1	<0.1	-
1,4-dichlorobenzene	mg/kg	0.1	<0.1	-
p-isopropyltoluene	mg/kg	0.1	<0.1	-
1,2-dichlorobenzene	mg/kg	0.1	<0.1	-
n-butylbenzene	mg/kg	0.1	<0.1	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	-
1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	-
Hexachlorobutadiene	mg/kg	0.1	<0.1	-
1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	-
Total VOC*	mg/kg	24	<24	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	<3.0	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	-

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
TRH C6-C9	mg/kg	20	<20
Benzene (F0)	mg/kg	0.1	<0.1
TRH C6-C10	mg/kg	25	**32**
TRH C6-C10 minus BTEX (F1)	mg/kg	25	**31**

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	**110**	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	**64**	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	**150**	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	**170**	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
TRH C10-C14	mg/kg	20	**32**
TRH C15-C28	mg/kg	45	**270**
TRH C29-C36	mg/kg	45	**140**
TRH C37-C40	mg/kg	100	<100
TRH >C10-C16	mg/kg	25	**66**
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	**66**
TRH >C16-C34 (F3)	mg/kg	90	**360**
TRH >C34-C40 (F4)	mg/kg	120	<120
TRH C10-C36 Total	mg/kg	110	**440**
TRH C10-C40 Total (F bands)	mg/kg	210	**430**

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Naphthalene	mg/kg	0.1	**0.1**	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	**0.6**	<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	**0.2**	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	**4.9**	<0.1	<0.1	**0.1**	**0.4**
Anthracene	mg/kg	0.1	**1.5**	<0.1	<0.1	<0.1	**0.1**
Fluoranthene	mg/kg	0.1	**10**	**0.2**	<0.1	**0.6**	**0.9**
Pyrene	mg/kg	0.1	**10**	**0.2**	<0.1	**0.6**	**1.0**
Benzo(a)anthracene	mg/kg	0.1	**5.7**	<0.1	<0.1	**0.4**	**0.5**
Chrysene	mg/kg	0.1	**5.5**	<0.1	<0.1	**0.3**	**0.5**
Benzo(b&j)fluoranthene	mg/kg	0.1	**7.0**	**0.1**	<0.1	**0.6**	**0.8**
Benzo(k)fluoranthene	mg/kg	0.1	**3.6**	<0.1	<0.1	**0.3**	**0.3**
Benzo(a)pyrene	mg/kg	0.1	**6.9**	<0.1	<0.1	**0.6**	**0.7**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**3.5**	<0.1	<0.1	**0.4**	**0.5**
Dibenzo(ah)anthracene	mg/kg	0.1	**0.5**	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**3.2**	<0.1	<0.1	**0.3**	**0.3**
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	**9.4**	<0.2	<0.2	**0.7**	**0.9**
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	**9.4**	<0.3	<0.3	**0.8**	**1.0**
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	**9.4**	<0.2	<0.2	**0.8**	**0.9**
Total PAH (18)	mg/kg	0.8	**64**	<0.8	<0.8	**4.2**	**5.9**
Total PAH (NEPM/WHO 16)	mg/kg	0.8	**64**	<0.8	<0.8	**4.2**	**5.9**

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
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	**0.3**
Acenaphthene	mg/kg	0.1	<0.1
Fluorene	mg/kg	0.1	<0.1
Phenanthrene	mg/kg	0.1	**1.3**
Anthracene	mg/kg	0.1	**0.4**
Fluoranthene	mg/kg	0.1	**3.5**
Pyrene	mg/kg	0.1	**3.5**
Benzo(a)anthracene	mg/kg	0.1	**1.8**
Chrysene	mg/kg	0.1	**1.7**
Benzo(b&j)fluoranthene	mg/kg	0.1	**3.1**
Benzo(k)fluoranthene	mg/kg	0.1	**1.8**
Benzo(a)pyrene	mg/kg	0.1	**2.8**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**2.2**
Dibenzo(ah)anthracene	mg/kg	0.1	**0.2**
Benzo(ghi)perylene	mg/kg	0.1	**1.6**
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	**3.9**
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	**3.9**
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	**3.9**
Total PAH (18)	mg/kg	0.8	**24**
Total PAH (NEPM/WHO 16)	mg/kg	0.8	**24**

OC Pesticides in Soil [AN420] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
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	1.4
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 [AN420] Tested: 9/4/2018 (continued)

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane	mg/kg	0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1
Aldrin	mg/kg	0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1
Dieldrin	mg/kg	0.05	<0.05
Endrin	mg/kg	0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1
Isodrin	mg/kg	0.1	<0.1
Mirex	mg/kg	0.1	<0.1

PCBs in Soil [AN420] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
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	D1 SOIL - 3/4/2018 SE177567.006
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

Total Phenolics in Soil [AN289] Tested: 10/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Total Phenols	mg/kg	5	<5	<5	<5	<5	<5

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
Total Phenols	mg/kg	5	<5

Total Cyanide in soil by Discrete Analyser (Aquakem) [AN077/AN287] Tested: 10/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Total Cyanide	mg/kg	0.5	**0.7**	<0.5	<0.5	<0.5	<0.5
Total Cyanide Post Chlorination	mg/kg	0.5	-	-	-	-	-
Cyanide Amenable to Chlorination	mg/kg	0.5	-	-	-	-	-

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
Total Cyanide	mg/kg	0.5	**0.6**
Total Cyanide Post Chlorination	mg/kg	0.5	-
Cyanide Amenable to Chlorination	mg/kg	0.5	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) [AN122] Tested: 10/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Exchangeable Sodium, Na	mg/kg	2	19	130	12
Exchangeable Sodium, Na	meq/100g	0.01	0.08	0.57	0.05
Exchangeable Sodium Percentage*	%	0.1	0.4	2.9	1.0
Exchangeable Potassium, K	mg/kg	2	160	110	33
Exchangeable Potassium, K	meq/100g	0.01	0.41	0.27	0.08
Exchangeable Potassium Percentage*	%	0.1	2.0	1.4	1.6
Exchangeable Calcium, Ca	mg/kg	2	3400	2700	1000
Exchangeable Calcium, Ca	meq/100g	0.01	17	13	5.0
Exchangeable Calcium Percentage*	%	0.1	84.3	68.7	93.8
Exchangeable Magnesium, Mg	mg/kg	2	330	640	23
Exchangeable Magnesium, Mg	meq/100g	0.02	2.7	5.3	0.19
Exchangeable Magnesium Percentage*	%	0.1	13.2	26.9	3.6
Cation Exchange Capacity	meq/100g	0.02	20	20	5.3

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 10/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Arsenic, As	mg/kg	3	5	4	<3	6	33
Cadmium, Cd	mg/kg	0.3	0.8	<0.3	0.3	0.3	0.8
Chromium, Cr	mg/kg	0.3	12	6.6	8.3	19	10
Copper, Cu	mg/kg	0.5	65	23	70	27	23
Lead, Pb	mg/kg	1	500	69	21	110	160
Nickel, Ni	mg/kg	0.5	7.0	4.5	57	16	76
Zinc, Zn	mg/kg	0.5	390	40	35	110	200

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
Arsenic, As	mg/kg	3	7
Cadmium, Cd	mg/kg	0.3	0.8
Chromium, Cr	mg/kg	0.3	30
Copper, Cu	mg/kg	0.5	66
Lead, Pb	mg/kg	1	270
Nickel, Ni	mg/kg	0.5	17
Zinc, Zn	mg/kg	0.5	700

Mercury in Soil [AN312] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Mercury	mg/kg	0.05	**0.25**	**0.10**	<0.05	<0.05	**0.16**

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
Mercury	mg/kg	0.05	**0.16**

Moisture Content [AN002] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
% Moisture	%w/w	0.5	11	20	13	10	13

PARAMETER	UOM	LOR	D1 SOIL - 3/4/2018 SE177567.006
% Moisture	%w/w	0.5	18

Gravimetric Determination of Asbestos in Soil [AN605] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567.001	HA6 SOIL 0.1-0.25 3/4/2018 SE177567.002	HA7 SOIL 0.05-0.3 3/4/2018 SE177567.003	HA8 SOIL 0.0-0.15 3/4/2018 SE177567.004	HA9 SOIL 0.2-0.35 3/4/2018 SE177567.005
Total Sample Weight*	g	1	**476**	**616**	**937**	**594**	**709**
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	-	ORG,NAD	NAD	NAD	NAD	NAD

Fibre ID in bulk materials [AN602] Tested: 11/4/2018

PARAMETER	UOM	LOR	HA5 FCP MATERIAL Surface 3/4/2018 SE177567.009
Asbestos Detected	No unit	-	Yes

VOCs in Water [AN433] Tested: 10/4/2018

PARAMETER	UOM	LOR	Rinsate R1 WATER - 3/4/2018 SE177567.007
Benzene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5
m/p-xylene	µg/L	1	<1
o-xylene	µg/L	0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5
Total BTEX	µg/L	3	<3
Naphthalene	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 10/4/2018

PARAMETER	UOM	LOR	Rinsate R1 WATER - 3/4/2018 SE177567.007
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 10/4/2018

PARAMETER	UOM	LOR	Rinsate R1 WATER - 3/4/2018 SE177567.007
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	200	<200
TRH C29-C36	µg/L	200	<200
TRH C37-C40	µg/L	200	<200
TRH >C10-C16	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C36	µg/L	450	<450
TRH C10-C40	µg/L	650	<650

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 10/4/2018

PARAMETER	UOM	LOR	Rinsate R1 WATER - 3/4/2018 SE177567.007
Naphthalene	µg/L	0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1
Fluorene	µg/L	0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1
Anthracene	µg/L	0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1
Pyrene	µg/L	0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1
Chrysene	µg/L	0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1
Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1
Total PAH (18)	µg/L	1	<1

OC Pesticides in Water [AN420] Tested: 10/4/2018

PARAMETER	UOM	LOR	Rinsate R1 WATER - 3/4/2018 SE177567.007
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Aldrin	µg/L	0.1	<0.1
Beta BHC	µg/L	0.1	<0.1
Delta BHC	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1
Dieldrin	µg/L	0.1	<0.1
Endrin	µg/L	0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Isodrin	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1

Metals in Water (Dissolved) by ICPOES [AN320] Tested: 10/4/2018

PARAMETER	UOM	LOR	Rinsate R1 WATER - 3/4/2018 SE177567.007
Arsenic, As	mg/L	0.02	<0.020
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

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 10/4/2018

PARAMETER	UOM	LOR	Rinsate R1 WATER - 3/4/2018 SE177567.007
Mercury	mg/L	0.00005	<0.00005

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.
AN077	Hydrogen cyanide is liberated from an acidified alkali soil extract by distillation and purging with air. The hydrogen cyanide gas is then collected by passing it through a sodium hydroxide scrubbing solution. The scrubbing solution will then be analysed for cyanide by the appropriate method.
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 Lyons, 2011, sections 15D3 and 15N1.-
AN287	A buffered distillate or water sample is treated with chloramine/barbituric acid reagents and the intensity of the colour developed is proportional to the cyanide concentration by Aquakem DA.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN320	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	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.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.

AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf). The fibres detected may or may not be asbestos fibres.
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%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

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STATEMENT OF QA/QC PERFORMANCE

SE177567 R0

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
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Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne**
Order Number	(Not specified)
Samples	9

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
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Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE177567 R0**
Date Received	04 Apr 2018
Date Reported	11 Apr 2018

COMMENTS

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

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

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

Duplicate	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	3 items
Matrix Spike	TRH (Total Recoverable Hydrocarbons) in Soil	2 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	7 Soil, 1 Water, 1 FC
Date documentation received	5/4/18@5:39pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.5°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE177567 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
HA5	SE177567.001	LB145253	03 Apr 2018	04 Apr 2018	01 May 2018	10 Apr 2018	01 May 2018	10 Apr 2018
HA7	SE177567.003	LB145253	03 Apr 2018	04 Apr 2018	01 May 2018	10 Apr 2018	01 May 2018	10 Apr 2018
HA9	SE177567.005	LB145253	03 Apr 2018	04 Apr 2018	01 May 2018	10 Apr 2018	01 May 2018	10 Apr 2018

Fibre ID in bulk materials

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5 FCP	SE177567.009	LB145420	03 Apr 2018	04 Apr 2018	03 Apr 2019	11 Apr 2018	03 Apr 2019	11 Apr 2018

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
HA5	SE177567.001	LB145213	03 Apr 2018	04 Apr 2018	30 Sep 2018	09 Apr 2018	30 Sep 2018	11 Apr 2018
HA6	SE177567.002	LB145213	03 Apr 2018	04 Apr 2018	30 Sep 2018	09 Apr 2018	30 Sep 2018	11 Apr 2018
HA7	SE177567.003	LB145213	03 Apr 2018	04 Apr 2018	30 Sep 2018	09 Apr 2018	30 Sep 2018	11 Apr 2018
HA8	SE177567.004	LB145213	03 Apr 2018	04 Apr 2018	30 Sep 2018	09 Apr 2018	30 Sep 2018	11 Apr 2018
HA9	SE177567.005	LB145213	03 Apr 2018	04 Apr 2018	30 Sep 2018	09 Apr 2018	30 Sep 2018	11 Apr 2018

Mercury (dissolved) in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE177567.007	LB145256	03 Apr 2018	04 Apr 2018	01 May 2018	10 Apr 2018	01 May 2018	10 Apr 2018

Mercury in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145218	03 Apr 2018	04 Apr 2018	01 May 2018	09 Apr 2018	01 May 2018	11 Apr 2018
HA6	SE177567.002	LB145218	03 Apr 2018	04 Apr 2018	01 May 2018	09 Apr 2018	01 May 2018	11 Apr 2018
HA7	SE177567.003	LB145218	03 Apr 2018	04 Apr 2018	01 May 2018	09 Apr 2018	01 May 2018	11 Apr 2018
HA8	SE177567.004	LB145218	03 Apr 2018	04 Apr 2018	01 May 2018	09 Apr 2018	01 May 2018	11 Apr 2018
HA9	SE177567.005	LB145218	03 Apr 2018	04 Apr 2018	01 May 2018	09 Apr 2018	01 May 2018	11 Apr 2018
D1	SE177567.006	LB145218	03 Apr 2018	04 Apr 2018	01 May 2018	09 Apr 2018	01 May 2018	11 Apr 2018

Metals in Water (Dissolved) by ICPOES

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE177567.007	LB145242	03 Apr 2018	04 Apr 2018	30 Sep 2018	10 Apr 2018	30 Sep 2018	10 Apr 2018

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145201	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	14 Apr 2018	10 Apr 2018
HA6	SE177567.002	LB145201	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	14 Apr 2018	10 Apr 2018
HA7	SE177567.003	LB145201	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	14 Apr 2018	10 Apr 2018
HA8	SE177567.004	LB145201	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	14 Apr 2018	10 Apr 2018
HA9	SE177567.005	LB145201	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	14 Apr 2018	10 Apr 2018
D1	SE177567.006	LB145201	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	14 Apr 2018	10 Apr 2018

OC Pesticides in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA6	SE177567.002	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA7	SE177567.003	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA8	SE177567.004	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA9	SE177567.005	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
D1	SE177567.006	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

OC Pesticides in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE177567.007	LB145255	03 Apr 2018	04 Apr 2018	10 Apr 2018	10 Apr 2018	20 May 2018	11 Apr 2018

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
HA5	SE177567.001	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA6	SE177567.002	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA7	SE177567.003	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

HOLDING TIME SUMMARY

SE177567 R0

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

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

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

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA8	SE177567.004	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA9	SE177567.005	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
D1	SE177567.006	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE177567.007	LB145255	03 Apr 2018	04 Apr 2018	10 Apr 2018	10 Apr 2018	20 May 2018	10 Apr 2018

PCBs in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA6	SE177567.002	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA7	SE177567.003	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA8	SE177567.004	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA9	SE177567.005	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
D1	SE177567.006	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145280	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA6	SE177567.002	LB145280	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA7	SE177567.003	LB145280	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA8	SE177567.004	LB145280	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA9	SE177567.005	LB145280	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
D1	SE177567.006	LB145280	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018

Total Phenolics in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145307	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA6	SE177567.002	LB145307	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA7	SE177567.003	LB145308	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA8	SE177567.004	LB145308	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
HA9	SE177567.005	LB145308	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018
D1	SE177567.006	LB145308	03 Apr 2018	04 Apr 2018	17 Apr 2018	10 Apr 2018	17 Apr 2018	11 Apr 2018

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

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145267	03 Apr 2018	04 Apr 2018	30 Sep 2018	10 Apr 2018	30 Sep 2018	10 Apr 2018
HA6	SE177567.002	LB145267	03 Apr 2018	04 Apr 2018	30 Sep 2018	10 Apr 2018	30 Sep 2018	10 Apr 2018
HA7	SE177567.003	LB145267	03 Apr 2018	04 Apr 2018	30 Sep 2018	10 Apr 2018	30 Sep 2018	10 Apr 2018
HA8	SE177567.004	LB145267	03 Apr 2018	04 Apr 2018	30 Sep 2018	10 Apr 2018	30 Sep 2018	10 Apr 2018
HA9	SE177567.005	LB145267	03 Apr 2018	04 Apr 2018	30 Sep 2018	10 Apr 2018	30 Sep 2018	10 Apr 2018
D1	SE177567.006	LB145267	03 Apr 2018	04 Apr 2018	30 Sep 2018	10 Apr 2018	30 Sep 2018	10 Apr 2018

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
HA5	SE177567.001	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA6	SE177567.002	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA7	SE177567.003	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA8	SE177567.004	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA9	SE177567.005	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
D1	SE177567.006	LB145181	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

TRH (Total Recoverable Hydrocarbons) in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE177567.007	LB145255	03 Apr 2018	04 Apr 2018	10 Apr 2018	10 Apr 2018	20 May 2018	11 Apr 2018

VOC's in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA6	SE177567.002	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA7	SE177567.003	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

HOLDING TIME SUMMARY

SE177567 R0

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

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

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

VOC's in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA8	SE177567.004	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA9	SE177567.005	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
D1	SE177567.006	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
Trip Spike TS1	SE177567.008	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

VOCs in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE177567.007	LB145263	03 Apr 2018	04 Apr 2018	10 Apr 2018	10 Apr 2018	20 May 2018	11 Apr 2018

Volatile Petroleum Hydrocarbons in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567.001	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA6	SE177567.002	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA7	SE177567.003	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA8	SE177567.004	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
HA9	SE177567.005	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
D1	SE177567.006	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018
Trip Spike TS1	SE177567.008	LB145187	03 Apr 2018	04 Apr 2018	17 Apr 2018	09 Apr 2018	19 May 2018	11 Apr 2018

Volatile Petroleum Hydrocarbons in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE177567.007	LB145263	03 Apr 2018	04 Apr 2018	10 Apr 2018	10 Apr 2018	20 May 2018	11 Apr 2018

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

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

OC Pesticides in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	HA5	SE177567.001	%	60 - 130%	105
	HA6	SE177567.002	%	60 - 130%	101
	HA7	SE177567.003	%	60 - 130%	99
	HA8	SE177567.004	%	60 - 130%	97
	HA9	SE177567.005	%	60 - 130%	102
	D1	SE177567.006	%	60 - 130%	113

OC Pesticides in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	51

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	HA5	SE177567.001	%	70 - 130%	96
	HA6	SE177567.002	%	70 - 130%	82
	HA7	SE177567.003	%	70 - 130%	94
	HA8	SE177567.004	%	70 - 130%	82
	HA9	SE177567.005	%	70 - 130%	94
	D1	SE177567.006	%	70 - 130%	96
d14-p-terphenyl (Surrogate)	HA5	SE177567.001	%	70 - 130%	92
	HA6	SE177567.002	%	70 - 130%	102
	HA7	SE177567.003	%	70 - 130%	112
	HA8	SE177567.004	%	70 - 130%	98
	HA9	SE177567.005	%	70 - 130%	110
	D1	SE177567.006	%	70 - 130%	96
d5-nitrobenzene (Surrogate)	HA5	SE177567.001	%	70 - 130%	86
	HA6	SE177567.002	%	70 - 130%	80
	HA7	SE177567.003	%	70 - 130%	86
	HA8	SE177567.004	%	70 - 130%	74
	HA9	SE177567.005	%	70 - 130%	86
	D1	SE177567.006	%	70 - 130%	86

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	56
d14-p-terphenyl (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	80
d5-nitrobenzene (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	44

PCBs in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	HA5	SE177567.001	%	60 - 130%	105
	HA6	SE177567.002	%	60 - 130%	101
	HA7	SE177567.003	%	60 - 130%	99
	HA8	SE177567.004	%	60 - 130%	97
	HA9	SE177567.005	%	60 - 130%	102
	D1	SE177567.006	%	60 - 130%	113

VOC's in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	HA5	SE177567.001	%	60 - 130%	80
	HA6	SE177567.002	%	60 - 130%	77
	HA7	SE177567.003	%	60 - 130%	82
	HA8	SE177567.004	%	60 - 130%	85
	HA9	SE177567.005	%	60 - 130%	75
	D1	SE177567.006	%	60 - 130%	92
	Trip Spike TS1	SE177567.008	%	60 - 130%	112
d4-1,2-dichloroethane (Surrogate)	HA5	SE177567.001	%	60 - 130%	78
	HA6	SE177567.002	%	60 - 130%	96
	HA7	SE177567.003	%	60 - 130%	93
	HA8	SE177567.004	%	60 - 130%	97
	HA9	SE177567.005	%	60 - 130%	85
	D1	SE177567.006	%	60 - 130%	89

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

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

VOC's in Soil (continued)

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d4-1,2-dichloroethane (Surrogate)	Trip Spike TS1	SE177567.008	%	60 - 130%	117
d8-toluene (Surrogate)	HA5	SE177567.001	%	60 - 130%	96
	HA6	SE177567.002	%	60 - 130%	89
	HA7	SE177567.003	%	60 - 130%	96
	HA8	SE177567.004	%	60 - 130%	98
	HA9	SE177567.005	%	60 - 130%	86
	D1	SE177567.006	%	60 - 130%	92
	Trip Spike TS1	SE177567.008	%	60 - 130%	114
Dibromofluoromethane (Surrogate)	HA5	SE177567.001	%	60 - 130%	78
	HA6	SE177567.002	%	60 - 130%	99
	HA7	SE177567.003	%	60 - 130%	71
	HA8	SE177567.004	%	60 - 130%	98
	HA9	SE177567.005	%	60 - 130%	72
	D1	SE177567.006	%	60 - 130%	78
	Trip Spike TS1	SE177567.008	%	60 - 130%	110

VOCs in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	82
d4-1,2-dichloroethane (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	100
d8-toluene (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	83
Dibromofluoromethane (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	92

Volatile Petroleum Hydrocarbons in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	HA5	SE177567.001	%	60 - 130%	80
	HA6	SE177567.002	%	60 - 130%	109
	HA7	SE177567.003	%	60 - 130%	75
	HA8	SE177567.004	%	60 - 130%	80
	HA9	SE177567.005	%	60 - 130%	75
	D1	SE177567.006	%	60 - 130%	85
d4-1,2-dichloroethane (Surrogate)	HA5	SE177567.001	%	60 - 130%	78
	HA6	SE177567.002	%	60 - 130%	86
	HA7	SE177567.003	%	60 - 130%	83
	HA8	SE177567.004	%	60 - 130%	86
	HA9	SE177567.005	%	60 - 130%	85
	D1	SE177567.006	%	60 - 130%	80
d8-toluene (Surrogate)	HA5	SE177567.001	%	60 - 130%	96
	HA6	SE177567.002	%	60 - 130%	77
	HA7	SE177567.003	%	60 - 130%	83
	HA8	SE177567.004	%	60 - 130%	110
	HA9	SE177567.005	%	60 - 130%	86
	D1	SE177567.006	%	60 - 130%	77
Dibromofluoromethane (Surrogate)	HA5	SE177567.001	%	60 - 130%	78
	HA6	SE177567.002	%	60 - 130%	89
	HA7	SE177567.003	%	60 - 130%	83
	HA8	SE177567.004	%	60 - 130%	87
	HA9	SE177567.005	%	60 - 130%	72
	D1	SE177567.006	%	60 - 130%	92

Volatile Petroleum Hydrocarbons in Water

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	82
d4-1,2-dichloroethane (Surrogate)	Rinsate R1	SE177567.007	%	60 - 130%	100
d8-toluene (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	83
Dibromofluoromethane (Surrogate)	Rinsate R1	SE177567.007	%	40 - 130%	92

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	Result
LB145253.001	Exchangeable Sodium, Na	mg/kg	2	0
	Exchangeable Potassium, K	mg/kg	2	0
	Exchangeable Calcium, Ca	mg/kg	2	0
	Exchangeable Magnesium, Mg	mg/kg	2	0

Mercury (dissolved) in Water

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

Sample Number	Parameter	Units	LOR	Result
LB145256.001	Mercury	mg/L	0.00005	<0.00005

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB145218.001	Mercury	mg/kg	0.05	<0.05

Metals in Water (Dissolved) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result
LB145242.001	Arsenic, As	mg/L	0.02	<0.020
	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]AN420

Sample Number		Parameter	Units	LOR	Result
LB145181.001		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)	%	-	94

OC Pesticides in Water

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

Sample Number	Parameter	Units	LOR	Result
LB145255.001	Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
	Alpha BHC	µg/L	0.1	<0.1
	Lindane (gamma BHC)	µg/L	0.1	<0.1
	Heptachlor	µg/L	0.1	<0.1
	Aldrin	µg/L	0.1	<0.1
	Beta BHC	µg/L	0.1	<0.1
	Delta BHC	µg/L	0.1	<0.1

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

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

OC Pesticides in Water (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB145255.001		Heptachlor epoxide	µg/L	0.1	<0.1
		Alpha Endosulfan	µg/L	0.1	<0.1
		Gamma Chlordane	µg/L	0.1	<0.1
		Alpha Chlordane	µg/L	0.1	<0.1
		p,p'-DDE	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Beta Endosulfan	µg/L	0.1	<0.1
		p,p'-DDD	µg/L	0.1	<0.1
		p,p'-DDT	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		Endrin aldehyde	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
		Isodrin	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	92

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB145181.001		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)	%	-	88
		2-fluorobiphenyl (Surrogate)	%	-	96
		d14-p-terphenyl (Surrogate)	%	-	108

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Sample Number		Parameter	Units	LOR	Result
LB145255.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(b&j&k)fluoranthene	µg/L	0.2	<0.2
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	66
		2-fluorobiphenyl (Surrogate)	%	-	66

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

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

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB145255.001	Surrogates	d14-p-terphenyl (Surrogate)	%	-	70

PCBs in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB145181.001		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)	%	-	94

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result
LB145280.001	Total Cyanide	mg/kg	0.5	<0.5

Total Phenolics in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB145307.001	Total Phenols	mg/kg	5	<5
LB145308.001	Total Phenols	mg/kg	5	<5

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

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

Sample Number	Parameter	Units	LOR	Result
LB145267.001	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
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	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
LB145181.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

TRH (Total Recoverable Hydrocarbons) in Water

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

Sample Number	Parameter	Units	LOR	Result
LB145255.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOC's in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB145187.001	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.1
		1,2-dichloropropane	mg/kg	0.1	<0.1
		cis-1,3-dichloropropene	mg/kg	0.1	<0.1
		trans-1,3-dichloropropene	mg/kg	0.1	<0.1
		1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1
		Chloromethane	mg/kg	1	<1
		Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1
		Bromomethane	mg/kg	1	<1

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

VOC's in Soil (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB145187.001	Halogenated Aliphatics	Chloroethane	mg/kg	1	<1
		Trichlorofluoromethane	mg/kg	1	<1
		Iodomethane	mg/kg	5	<5
		1,1-dichloroethene	mg/kg	0.1	<0.1
		Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5
		Allyl chloride	mg/kg	0.1	<0.1
		trans-1,2-dichloroethene	mg/kg	0.1	<0.1
		1,1-dichloroethane	mg/kg	0.1	<0.1
		cis-1,2-dichloroethene	mg/kg	0.1	<0.1
		Bromochloromethane	mg/kg	0.1	<0.1
		1,2-dichloroethane	mg/kg	0.1	<0.1
		1,1,1-trichloroethane	mg/kg	0.1	<0.1
		1,1-dichloropropene	mg/kg	0.1	<0.1
		Carbon tetrachloride	mg/kg	0.1	<0.1
		Dibromomethane	mg/kg	0.1	<0.1
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1
		1,1,2-trichloroethane	mg/kg	0.1	<0.1
		1,3-dichloropropane	mg/kg	0.1	<0.1
		Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1
		1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1
		cis-1,4-dichloro-2-butene	mg/kg	1	<1
		1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1
		1,2,3-trichloropropane	mg/kg	0.1	<0.1
		trans-1,4-dichloro-2-butene	mg/kg	1	<1
		1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1
		Hexachlorobutadiene	mg/kg	0.1	<0.1
	Halogenated Aromatics	Chlorobenzene	mg/kg	0.1	<0.1
		Bromobenzene	mg/kg	0.1	<0.1
		2-chlorotoluene	mg/kg	0.1	<0.1
		4-chlorotoluene	mg/kg	0.1	<0.1
		1,3-dichlorobenzene	mg/kg	0.1	<0.1
		1,4-dichlorobenzene	mg/kg	0.1	<0.1
		1,2-dichlorobenzene	mg/kg	0.1	<0.1
		1,2,4-trichlorobenzene	mg/kg	0.1	<0.1
		1,2,3-trichlorobenzene	mg/kg	0.1	<0.1
	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		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
		Styrene (Vinyl benzene)	mg/kg	0.1	<0.1
		Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1
		n-propylbenzene	mg/kg	0.1	<0.1
		1,3,5-trimethylbenzene	mg/kg	0.1	<0.1
		tert-butylbenzene	mg/kg	0.1	<0.1
		1,2,4-trimethylbenzene	mg/kg	0.1	<0.1
		sec-butylbenzene	mg/kg	0.1	<0.1
		p-isopropyltoluene	mg/kg	0.1	<0.1
		n-butylbenzene	mg/kg	0.1	<0.1
	Nitrogenous Compounds	Acrylonitrile	mg/kg	0.1	<0.1
		2-nitropropane	mg/kg	10	<10
	Oxygenated Compounds	Acetone (2-propanone)	mg/kg	10	<10
		MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1
		Vinyl acetate	mg/kg	10	<10
		MEK (2-butanone)	mg/kg	10	<10
		MIBK (4-methyl-2-pentanone)	mg/kg	1	<1
		2-hexanone (MBK)	mg/kg	5	<5
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Sulphonated	Carbon disulfide	mg/kg	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	117
		d4-1,2-dichloroethane (Surrogate)	%	-	110

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VOC's in Soil (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB145187.001	Surrogates	d8-toluene (Surrogate)	%	-	117
		Bromofluorobenzene (Surrogate)	%	-	99
	Totals	Total BTEX	mg/kg	0.6	<0.6
		Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8
		Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8
	Trihalomethanes	Chloroform	mg/kg	0.1	<0.1
		Bromodichloromethane	mg/kg	0.1	<0.1
		Chlorodibromomethane	mg/kg	0.1	<0.1
		Bromoform	mg/kg	0.1	<0.1

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result
LB145263.001	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5
	Hydrocarbons	Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	120
		d4-1,2-dichloroethane (Surrogate)	%	-	108
		d8-toluene (Surrogate)	%	-	101
		Bromofluorobenzene (Surrogate)	%	-	95

Volatile Petroleum Hydrocarbons in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB145187.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	105
		d4-1,2-dichloroethane (Surrogate)	%	-	98
		d8-toluene (Surrogate)	%	-	99

Volatile Petroleum Hydrocarbons in Water

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

Sample Number		Parameter	Units	LOR	Result
LB145263.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	120
		d4-1,2-dichloroethane (Surrogate)	%	-	96
		d8-toluene (Surrogate)	%	-	101
		Bromofluorobenzene (Surrogate)	%	-	76

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

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

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

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

Mercury (dissolved) in Water

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177506.001	LB145256.014	Mercury	µg/L	0.00005	-0.0078	-0.0096	200	0
SE177635.006	LB145256.024	Mercury	µg/L	0.00005	<0.0001	<0.0001	200	0

Mercury in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177480.039	LB145218.014	Mercury	mg/kg	0.05	0.016640378	1 0.0237636021	200	0
SE177567.006	LB145218.024	Mercury	mg/kg	0.05	0.16	0.15	62	3

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177553.001	LB145201.011	% Moisture	%w/w	0.5	93.4	93.4	31	0
SE177584.003	LB145201.022	% Moisture	%w/w	0.5	5.01792114	697.4157303370	46	39
SE177634.002	LB145201.033	% Moisture	%w/w	0.5	14	16	37	17
SE177634.005	LB145201.037	% Moisture	%w/w	0.5	9.6	9.8	40	2

OC Pesticides in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177567.005	LB145181.014		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	1.4	1.2	38	20
			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 %
SE177567.005	LB145181.014	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	0.2	113	40
		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	0.4	0.5	52	22
		Anthracene	mg/kg	0.1	0.1	0.2	95	45
		Fluoranthene	mg/kg	0.1	0.9	1.1	40	19
		Pyrene	mg/kg	0.1	1.0	1.1	40	13
		Benzo(a)anthracene	mg/kg	0.1	0.5	0.6	48	21
		Chrysene	mg/kg	0.1	0.5	0.5	50	16

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 %
SE177567.005	LB145181.014		Benzo(b&j)fluoranthene	mg/kg	0.1	0.8	0.9	42	18
			Benzo(k)fluoranthene	mg/kg	0.1	0.3	0.5	55	28
			Benzo(a)pyrene	mg/kg	0.1	0.7	0.7	45	2
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.5	0.5	52	4
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	197	0
			Benzo(ghi)perylene	mg/kg	0.1	0.3	0.4	58	17
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	0.9	0.9	33	4
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	1.0	1.0	40	3
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	0.9	1.0	31	4
			Total PAH (18)	mg/kg	0.8	5.9	7.1	42	19
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	0.5	30	10

PCBs in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177567.005	LB145181.014		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	1

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177567.001	LB145280.004	Total Cyanide	mg/kg	0.5	0.7	0.7	103	3

Total Phenolics in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177480.032	LB145307.004	Total Phenols	mg/kg	5	0.0873850558	0.0549340782	156	0
SE177567.003	LB145308.004	Total Phenols	mg/kg	5	<5	<5	200	0

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

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177480.039	LB145267.014	Arsenic, As	mg/kg	3	4.1380834512	4.272512	54	3
		Cadmium, Cd	mg/kg	0.3	0.0456742102	0.04604	200	0
		Chromium, Cr	mg/kg	0.3	20.0646805752	23.420548	32	15
		Copper, Cu	mg/kg	0.5	17.0638849599	17.58728	33	3
		Nickel, Ni	mg/kg	0.5	24.1570898161	26.942608	32	11
		Lead, Pb	mg/kg	1	16.4198785950	14.286212	37	14
		Zinc, Zn	mg/kg	0.5	41.4676155115	44.686424	35	7
SE177567.006	LB145267.024	Arsenic, As	mg/kg	3	7	7	45	7
		Cadmium, Cd	mg/kg	0.3	0.8	0.7	70	8
		Chromium, Cr	mg/kg	0.3	30	14	32	75 ②
		Copper, Cu	mg/kg	0.5	66	64	31	3
		Nickel, Ni	mg/kg	0.5	17	6.2	34	93 ②
		Lead, Pb	mg/kg	1	270	310	30	13
		Zinc, Zn	mg/kg	0.5	700	450	30	44 ②

TRH (Total Recoverable Hydrocarbons) in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177567.005	LB145181.014	TRH C10-C14	mg/kg	20	<20	<20	200	0
		TRH C15-C28	mg/kg	45	<45	<45	200	0
		TRH C29-C36	mg/kg	45	<45	<45	200	0

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

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

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TRH (Total Recoverable Hydrocarbons) in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177567.005	LB145181.014		TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE177584.006	LB145181.032		TRH C10-C14	mg/kg	20	0	0	200	0
			TRH C15-C28	mg/kg	45	0	0	200	0
			TRH C29-C36	mg/kg	45	0	0	200	0
			TRH C37-C40	mg/kg	100	0	0	200	0
			TRH C10-C36 Total	mg/kg	110	0	0	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	0	0	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	0	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	0	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	0	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	0	0	200	0

VOC's in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177584.003	LB145187.023	Fumigants	2,2-dichloropropane	mg/kg	0.1	0	0	200	0
			1,2-dichloropropane	mg/kg	0.1	0	0	200	0
			cis-1,3-dichloropropene	mg/kg	0.1	0	0	200	0
			trans-1,3-dichloropropene	mg/kg	0.1	0	0	200	0
			1,2-dibromoethane (EDB)	mg/kg	0.1	0	0	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	mg/kg	1	0	0	200	0
		Aliphatics	Chloromethane	mg/kg	1	0	0	200	0
			Vinyl chloride (Chloroethene)	mg/kg	0.1	0	0	200	0
			Bromomethane	mg/kg	1	0	0	200	0
			Chloroethane	mg/kg	1	0	0	200	0
			Trichlorofluoromethane	mg/kg	1	0.02	0	200	0
			Iodomethane	mg/kg	5	0	0	200	0
			1,1-dichloroethene	mg/kg	0.1	0	0	200	0
			Dichloromethane (Methylene chloride)	mg/kg	0.5	0	0	200	0
			Allyl chloride	mg/kg	0.1	0	0	200	0
			trans-1,2-dichloroethene	mg/kg	0.1	0	0	200	0
			1,1-dichloroethane	mg/kg	0.1	0	0	200	0
			cis-1,2-dichloroethene	mg/kg	0.1	0	0	200	0
			Bromochloromethane	mg/kg	0.1	0	0	200	0
			1,2-dichloroethane	mg/kg	0.1	0	0	200	0
			1,1,1-trichloroethane	mg/kg	0.1	0	0	200	0
			1,1-dichloropropene	mg/kg	0.1	0	0	200	0
			Carbon tetrachloride	mg/kg	0.1	0	0	200	0
			Dibromomethane	mg/kg	0.1	0	0	200	0
			Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	0	0	200	0
			1,1,2-trichloroethane	mg/kg	0.1	0	0	200	0
			1,3-dichloropropane	mg/kg	0.1	0	0	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	0	0	200	0
			1,1,1,2-tetrachloroethane	mg/kg	0.1	0	0	200	0
			cis-1,4-dichloro-2-butene	mg/kg	1	0	0	200	0
			1,1,2,2-tetrachloroethane	mg/kg	0.1	0	0	200	0
			1,2,3-trichloropropane	mg/kg	0.1	0	0	200	0
			trans-1,4-dichloro-2-butene	mg/kg	1	0	0	200	0
			1,2-dibromo-3-chloropropane	mg/kg	0.1	0	0	200	0
			Hexachlorobutadiene	mg/kg	0.1	0	0	200	0
		Halogenated	Chlorobenzene	mg/kg	0.1	0	0	200	0
		Aromatics	Bromobenzene	mg/kg	0.1	0	0	200	0
			2-chlorotoluene	mg/kg	0.1	0	0	200	0
			4-chlorotoluene	mg/kg	0.1	0	0	200	0
			1,3-dichlorobenzene	mg/kg	0.1	0	0	200	0
			1,4-dichlorobenzene	mg/kg	0.1	0	0	200	0

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VOC's in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177584.003	LB145187.023	Halogenated	1,2-dichlorobenzene	mg/kg	0.1	0	0	200	0
		Aromatics	1,2,4-trichlorobenzene	mg/kg	0.1	0	0	200	0
			1,2,3-trichlorobenzene	mg/kg	0.1	0	0	200	0
		Monocyclic	Benzene	mg/kg	0.1	0.02	0.02	200	0
		Aromatic	Toluene	mg/kg	0.1	0.03	0.02	200	0
			Ethylbenzene	mg/kg	0.1	0	0.01	200	0
			m/p-xylene	mg/kg	0.2	0.02	0	200	0
			o-xylene	mg/kg	0.1	0.01	0.01	200	0
			Styrene (Vinyl benzene)	mg/kg	0.1	0	0.05	200	0
			Isopropylbenzene (Cumene)	mg/kg	0.1	0	0	200	0
			n-propylbenzene	mg/kg	0.1	0	0	200	0
			1,3,5-trimethylbenzene	mg/kg	0.1	0	0	200	0
			tert-butylbenzene	mg/kg	0.1	0	0	200	0
			1,2,4-trimethylbenzene	mg/kg	0.1	0	0	200	0
			sec-butylbenzene	mg/kg	0.1	0	0	200	0
			p-isopropyltoluene	mg/kg	0.1	0	0	200	0
			n-butylbenzene	mg/kg	0.1	0	0	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	0	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.78	5.42	50	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.92	5.31	50	8
			d8-toluene (Surrogate)	mg/kg	-	4.92	4.98	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.09	4.3	50	5
		Totals	Total Xylenes	mg/kg	0.3	0.03	0.01	200	0
			Total BTEX	mg/kg	0.6	0.08	0.06	200	0
			Total VOC*	mg/kg	24	#VALUE!	0.11		
			Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	0.02	0	200	0
			Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	0	0	200	0
			Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	0	0	200	0
		Trihalomethan	Chloroform	mg/kg	0.1	0	0	200	0
		es	Bromodichloromethane	mg/kg	0.1	0	0	200	0
			Chlorodibromomethane	mg/kg	0.1	0	0	200	0
			Bromoform	mg/kg	0.1	0	0	200	0
SE177584.010	LB145187.022	Monocyclic	Benzene	mg/kg	0.1	0.03	0.03	200	0
		Aromatic	Toluene	mg/kg	0.1	0	0	200	0
			Ethylbenzene	mg/kg	0.1	0	0	200	0
			m/p-xylene	mg/kg	0.2	0	0	200	0
			o-xylene	mg/kg	0.1	0	0	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	0	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.76	3.88	50	3
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.88	3.88	50	0
			d8-toluene (Surrogate)	mg/kg	-	4.12	4.83	50	16
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.69	4.33	50	16
		Totals	Total Xylenes	mg/kg	0.3	0	0	200	0
			Total BTEX	mg/kg	0.6	0.03	0.03	200	0

VOCs in Water

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177482.001	LB145263.021	Monocyclic	Benzene	µg/L	0.5	0	0	200	0
		Aromatic	Toluene	µg/L	0.5	0.05	0	200	0
			Ethylbenzene	µg/L	0.5	0.02	0	200	0
			m/p-xylene	µg/L	1	0.01	0	200	0
			o-xylene	µg/L	0.5	0.01	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	0.02	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.5	6.15	30	11
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.68	5.2	30	9
			d8-toluene (Surrogate)	µg/L	-	5.64	6.42	30	13
			Bromofluorobenzene (Surrogate)	µg/L	-	5.04	5.85	30	15
SE177482.009	LB145263.022	Monocyclic	Benzene	µg/L	0.5	0	0	200	0
		Aromatic	Toluene	µg/L	0.5	0.04	0	200	0
			Ethylbenzene	µg/L	0.5	0.02	0	200	0
			m/p-xylene	µg/L	1	0.01	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.

VOCs in Water (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177482.009	LB145263.022	Monocyclic	o-xylene	µg/L	0.5	0.01	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	0.01	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.75	4.13	30	14
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.23	4.44	30	16
			d8-toluene (Surrogate)	µg/L	-	5.52	5.43	30	2
			Bromofluorobenzene (Surrogate)	µg/L	-	5.17	4.73	30	9

Volatile Petroleum Hydrocarbons in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177584.003	LB145187.025		TRH C6-C10	mg/kg	25	0	0	200	0
			TRH C6-C9	mg/kg	20	0	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.26	4.86	30	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.38	4.72	30	7
			d8-toluene (Surrogate)	mg/kg	-	4.86	5.18	30	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.93	4.19	30	6
		VPH F Bands	Benzene (F0)	mg/kg	0.1	0.02	0.03	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	-0.06	-0.07	200	0
SE177584.010	LB145187.022		TRH C6-C10	mg/kg	25	0	0	200	0
			TRH C6-C9	mg/kg	20	0	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.76	3.88	30	3
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.88	3.88	30	0
			d8-toluene (Surrogate)	mg/kg	-	4.12	4.83	30	16
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.69	4.33	30	16
		VPH F Bands	Benzene (F0)	mg/kg	0.1	0.03	0.03	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	-0.03	-0.03	200	0

Volatile Petroleum Hydrocarbons in Water

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE177482.001	LB145263.021		TRH C6-C10	µg/L	50	0	0	200	0
			TRH C6-C9	µg/L	40	0	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.9	4.92	30	0
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.1	6.19	30	19
			d8-toluene (Surrogate)	µg/L	-	5.38	4.91	30	9
			Bromofluorobenzene (Surrogate)	µg/L	-	3.94	4.93	30	22
		VPH F Bands	Benzene (F0)	µg/L	0.5	0	0	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	-0.09	0	200	0
SE177482.009	LB145263.022		TRH C6-C10	µg/L	50	0	0	200	0
			TRH C6-C9	µg/L	40	0	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.3	4.37	30	2
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.71	3.99	30	17
			d8-toluene (Surrogate)	µg/L	-	5.35	5.27	30	2
			Bromofluorobenzene (Surrogate)	µg/L	-	3.98	3.87	30	3
		VPH F Bands	Benzene (F0)	µg/L	0.5	0	0	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	-0.08	0	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 %
LB145253.002	Exchangeable Sodium, Na	mg/kg	2	NA	72.68	80 - 120	90
	Exchangeable Potassium, K	mg/kg	2	NA	238.12	80 - 120	87
	Exchangeable Calcium, Ca	mg/kg	2	NA	692	80 - 120	94
	Exchangeable Magnesium, Mg	mg/kg	2	NA	134.2	80 - 120	97

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145218.002	Mercury	mg/kg	0.05	0.18	0.2	70 - 130	90

Metals in Water (Dissolved) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145242.002	Arsenic, As	mg/L	0.02	2.0	2	80 - 120	100
	Cadmium, Cd	mg/L	0.001	2.1	2	80 - 120	104
	Chromium, Cr	mg/L	0.005	2.1	2	80 - 120	103
	Copper, Cu	mg/L	0.005	2.1	2	80 - 120	105
	Lead, Pb	mg/L	0.02	2.1	2	80 - 120	105
	Nickel, Ni	mg/L	0.005	2.0	2	80 - 120	100
	Zinc, Zn	mg/L	0.01	2.1	2	80 - 120	106

OC Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145181.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	103
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	107
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	92
		Dieldrin	mg/kg	0.05	0.22	0.2	60 - 140	108
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	95
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	78
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.15	40 - 130	95

OC Pesticides in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145255.002		Heptachlor	µg/L	0.1	0.2	0.2	60 - 140	80
		Aldrin	µg/L	0.1	0.2	0.2	60 - 140	78
		Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	80
		Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	83
		Endrin	µg/L	0.1	0.2	0.2	60 - 140	115
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	78
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.13	0.15	40 - 130	84

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145181.002		Naphthalene	mg/kg	0.1	4.3	4	60 - 140	107
		Acenaphthylene	mg/kg	0.1	4.3	4	60 - 140	108
		Acenaphthene	mg/kg	0.1	4.0	4	60 - 140	101
		Phenanthrene	mg/kg	0.1	4.4	4	60 - 140	111
		Anthracene	mg/kg	0.1	4.2	4	60 - 140	106
		Fluoranthene	mg/kg	0.1	4.3	4	60 - 140	107
		Pyrene	mg/kg	0.1	4.2	4	60 - 140	104
		Benzo(a)pyrene	mg/kg	0.1	4.6	4	60 - 140	115
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	102
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	106

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145255.002	Naphthalene	µg/L	0.1	30	40	60 - 140	74
	Acenaphthylene	µg/L	0.1	28	40	60 - 140	70
	Acenaphthene	µg/L	0.1	28	40	60 - 140	70
	Phenanthrene	µg/L	0.1	33	40	60 - 140	81
	Anthracene	µg/L	0.1	35	40	60 - 140	88
	Fluoranthene	µg/L	0.1	33	40	60 - 140	82
	Pyrene	µg/L	0.1	32	40	60 - 140	80

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

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

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145255.002		Benzo(a)pyrene	µg/L	0.1	37	40	60 - 140	92
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.35	0.5	40 - 130	70
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.35	0.5	40 - 130	70
		d14-p-terphenyl (Surrogate)	µg/L	-	0.41	0.5	40 - 130	82

PCBs in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145181.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	110

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145280.002	Total Cyanide	mg/kg	0.5	<0.5	0.25	70 - 130	103

Total Phenolics in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145307.002	Total Phenols	mg/kg	5	<5	2.5	70 - 130	92
LB145308.002	Total Phenols	mg/kg	5	<5	2.5	70 - 130	89

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

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145267.002	Arsenic, As	mg/kg	3	310	336.32	79 - 120	92
	Cadmium, Cd	mg/kg	0.3	420	416.6	69 - 131	102
	Chromium, Cr	mg/kg	0.3	32	35.2	80 - 120	91
	Copper, Cu	mg/kg	0.5	310	370.46	80 - 120	83
	Nickel, Ni	mg/kg	0.5	180	210.88	79 - 120	84
	Lead, Pb	mg/kg	1	91	107.87	79 - 120	84
	Zinc, Zn	mg/kg	0.5	270	301.27	80 - 121	90

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145181.002		TRH C10-C14	mg/kg	20	34	40	60 - 140	85
		TRH C15-C28	mg/kg	45	50	40	60 - 140	125
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	110
	TRH F Bands	TRH >C10-C16	mg/kg	25	40	40	60 - 140	100
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	128
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	110

TRH (Total Recoverable Hydrocarbons) in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145255.002		TRH C10-C14	µg/L	50	1100	1200	60 - 140	95
		TRH C15-C28	µg/L	200	1300	1200	60 - 140	110
		TRH C29-C36	µg/L	200	1400	1200	60 - 140	121
	TRH F Bands	TRH >C10-C16	µg/L	60	1200	1200	60 - 140	101
		TRH >C16-C34 (F3)	µg/L	500	1400	1200	60 - 140	118
		TRH >C34-C40 (F4)	µg/L	500	710	600	60 - 140	119

VOC's in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145187.002	Halogenated	1,1-dichloroethene	mg/kg	0.1	1.8	2.56	60 - 140	71
	Aliphatics	1,2-dichloroethane	mg/kg	0.1	2.3	2.56	60 - 140	90
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	3.2	2.56	60 - 140	124
	Halogenated	Chlorobenzene	mg/kg	0.1	3.4	2.56	60 - 140	131
	Monocyclic	Benzene	mg/kg	0.1	2.1	2.9	60 - 140	73
	Aromatic	Toluene	mg/kg	0.1	1.9	2.9	60 - 140	67
		Ethylbenzene	mg/kg	0.1	3.5	2.9	60 - 140	121
		m/p-xylene	mg/kg	0.2	7.2	5.8	60 - 140	124
		o-xylene	mg/kg	0.1	3.5	2.9	60 - 140	119
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	90
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	5	60 - 140	88

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

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

VOC's in Soil (continued)

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145187.002	Surrogates	d8-toluene (Surrogate)	mg/kg	-	4.4	5	60 - 140	88
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.0	5	60 - 140	79
	Trihalomethan	Chloroform	mg/kg	0.1	2.0	2.56	60 - 140	77

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145263.002	Monocyclic	Benzene	µg/L	0.5	50	45.45	60 - 140	110
	Aromatic	Toluene	µg/L	0.5	49	45.45	60 - 140	109
		Ethylbenzene	µg/L	0.5	50	45.45	60 - 140	109
		m/p-xylene	µg/L	1	99	90.9	60 - 140	109
		o-xylene	µg/L	0.5	49	45.45	60 - 140	108
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.2	5	60 - 140	104
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.8	5	60 - 140	96
		d8-toluene (Surrogate)	µg/L	-	4.4	5	60 - 140	88
		Bromofluorobenzene (Surrogate)	µg/L	-	5.0	5	60 - 140	99

Volatile Petroleum Hydrocarbons in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145187.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	84
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	72
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.0	5	60 - 140	80
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.1	5	60 - 140	82
		d8-toluene (Surrogate)	mg/kg	-	4.2	5	60 - 140	83
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	5	60 - 140	97
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	75

Volatile Petroleum Hydrocarbons in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145263.002		TRH C6-C10	µg/L	50	1000	946.63	60 - 140	106
		TRH C6-C9	µg/L	40	820	818.71	60 - 140	100
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.9	5	60 - 140	98
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.6	5	60 - 140	92
		d8-toluene (Surrogate)	µg/L	-	5.1	5	60 - 140	102
		Bromofluorobenzene (Surrogate)	µg/L	-	5.3	5	60 - 140	106
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	700	639.67	60 - 140	110

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

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

Mercury (dissolved) in Water

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177482.001	LB145256.004	Mercury	mg/L	0.00005	0.0073	-0.0016	0.008	91

Mercury in Soil

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177480.030	LB145218.004	Mercury	mg/kg	0.05	0.20	0.01820883026	0.2	89

Metals in Water (Dissolved) by ICPOES

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177567.007	LB145242.004	Arsenic, As	mg/L	0.02	2.1	<0.020	2	106
		Cadmium, Cd	mg/L	0.001	2.1	<0.001	2	107
		Chromium, Cr	mg/L	0.005	2.1	<0.005	2	106
		Copper, Cu	mg/L	0.005	2.2	<0.005	2	108
		Lead, Pb	mg/L	0.02	2.2	<0.02	2	107
		Nickel, Ni	mg/L	0.005	2.0	<0.005	2	102
		Zinc, Zn	mg/L	0.01	2.2	<0.01	2	108

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE177475.005	LB145181.032		Naphthalene	mg/kg	0.1	<0.1	4	100
			2-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	<0.1	4	93
			Acenaphthene	mg/kg	0.1	<0.1	4	90
			Fluorene	mg/kg	0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	0.2	4	102
			Anthracene	mg/kg	0.1	<0.1	4	101
			Fluoranthene	mg/kg	0.1	0.6	4	99
			Pyrene	mg/kg	0.1	0.6	4	97
			Benzo(a)anthracene	mg/kg	0.1	0.3	-	-
			Chrysene	mg/kg	0.1	0.3	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.4	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	0.2	-	-
			Benzo(a)pyrene	mg/kg	0.1	0.4	4	100
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.2	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	0.5	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	0.6	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	0.5	-	-
			Total PAH (18)	mg/kg	0.8	3.4	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	-	80
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	-	86
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	-	96

Total Phenolics in Soil

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177567.002	LB145307.021	Total Phenols	mg/kg	5	<5	<5	2.5	83
SE177567.006	LB145308.008	Total Phenols	mg/kg	5	<5	<5	2.5	78

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

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177480.030	LB145267.004	Arsenic, As	mg/kg	3	48	4.52439586447	50	87
		Cadmium, Cd	mg/kg	0.3	48	0.07364225211	50	95
		Chromium, Cr	mg/kg	0.3	NVL	NVL	NVL	NVL
		Copper, Cu	mg/kg	0.5	NVL	NVL	NVL	NVL
		Nickel, Ni	mg/kg	0.5	59	16.33016940707	50	85
		Lead, Pb	mg/kg	1	67	15.8192762830(	50	103

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

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

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

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177480.030	LB145267.004	Zinc, Zn	mg/kg	0.5	88	46.2565396113€	50	84

TRH (Total Recoverable Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE177475.005	LB145181.031		TRH C10-C14	mg/kg	20	<20	40	110
			TRH C15-C28	mg/kg	45	57	40	55 ⑨
			TRH C29-C36	mg/kg	45	<45	40	108
			TRH C37-C40	mg/kg	100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	40	138
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	50 ⑨
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-

VOC's in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177567.001	LB145187.004	Monocyclic	Benzene	mg/kg	0.1	2.4	<0.1	2.9	83
		Aromatic	Toluene	mg/kg	0.1	2.2	<0.1	2.9	76
			Ethylbenzene	mg/kg	0.1	2.7	<0.1	2.9	91
			m/p-xylene	mg/kg	0.2	6.8	0.6	5.8	108
			o-xylene	mg/kg	0.1	3.3	0.2	2.9	107
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0.2	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.9	3.9	-	78
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.6	3.9	-	72
			d8-toluene (Surrogate)	mg/kg	-	3.9	4.8	-	77
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	4.0	-	95
		Totals	Total Xylenes	mg/kg	0.3	10	0.8	-	-
			Total BTEX	mg/kg	0.6	17	0.9	-	-
SE177584.009	LB145187.024	Fumigants	2,2-dichloropropane	mg/kg	0.1		0	-	-
			1,2-dichloropropane	mg/kg	0.1		0	-	-
			cis-1,3-dichloropropene	mg/kg	0.1		0	-	-
			trans-1,3-dichloropropene	mg/kg	0.1		0	-	-
			1,2-dibromoethane (EDB)	mg/kg	0.1		0	-	-
		Halogenated	Dichlorodifluoromethane (CFC-12)	mg/kg	1		0	-	-
		Aliphatics	Chloromethane	mg/kg	1		0	-	-
			Vinyl chloride (Chloroethene)	mg/kg	0.1		0	-	-
			Bromomethane	mg/kg	1		0.08	-	-
			Chloroethane	mg/kg	1		0	-	-
			Trichlorofluoromethane	mg/kg	1		0	-	-
			Iodomethane	mg/kg	5		0	-	-
			1,1-dichloroethene	mg/kg	0.1		0	2.56	68
			Dichloromethane (Methylene chloride)	mg/kg	0.5		0	-	-
			Allyl chloride	mg/kg	0.1		0	-	-
			trans-1,2-dichloroethene	mg/kg	0.1		0	-	-
			1,1-dichloroethane	mg/kg	0.1		0	-	-
			cis-1,2-dichloroethene	mg/kg	0.1		0	-	-
			Bromochloromethane	mg/kg	0.1		0	-	-
			1,2-dichloroethane	mg/kg	0.1		0	2.56	87
			1,1,1-trichloroethane	mg/kg	0.1		0	-	-
			1,1-dichloropropene	mg/kg	0.1		0	-	-
			Carbon tetrachloride	mg/kg	0.1		0	-	-
			Dibromomethane	mg/kg	0.1		0	-	-
			Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1		0	2.56	123
			1,1,2-trichloroethane	mg/kg	0.1		0	-	-
			1,3-dichloropropane	mg/kg	0.1		0	-	-
			Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1		0	-	-
			1,1,1,2-tetrachloroethane	mg/kg	0.1		0	-	-
			cis-1,4-dichloro-2-butene	mg/kg	1		0	-	-
			1,1,2,2-tetrachloroethane	mg/kg	0.1		0	-	-
			1,2,3-trichloropropane	mg/kg	0.1		0	-	-
			trans-1,4-dichloro-2-butene	mg/kg	1		0	-	-

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

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

VOC's in Soil (continued)

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177584.009	LB145187.024	Halogenated	1,2-dibromo-3-chloropropane	mg/kg	0.1		0	-	-
		Aliphatics	Hexachlorobutadiene	mg/kg	0.1		0	-	-
		Halogenated	Chlorobenzene	mg/kg	0.1		0	2.56	134
		Aromatics	Bromobenzene	mg/kg	0.1		0	-	-
			2-chlorotoluene	mg/kg	0.1		0	-	-
			4-chlorotoluene	mg/kg	0.1		0	-	-
			1,3-dichlorobenzene	mg/kg	0.1		0	-	-
			1,4-dichlorobenzene	mg/kg	0.1		0	-	-
			1,2-dichlorobenzene	mg/kg	0.1		0	-	-
			1,2,4-trichlorobenzene	mg/kg	0.1		0	-	-
			1,2,3-trichlorobenzene	mg/kg	0.1		0	-	-
		Monocyclic	Benzene	mg/kg	0.1		0.03	2.9	77
		Aromatic	Toluene	mg/kg	0.1		0	2.9	118
			Ethylbenzene	mg/kg	0.1		0	2.9	120
			m/p-xylene	mg/kg	0.2		0	5.8	124
			o-xylene	mg/kg	0.1		0	2.9	121
			Styrene (Vinyl benzene)	mg/kg	0.1		0	-	-
			Isopropylbenzene (Cumene)	mg/kg	0.1		0	-	-
			n-propylbenzene	mg/kg	0.1		0	-	-
			1,3,5-trimethylbenzene	mg/kg	0.1		0	-	-
			tert-butylbenzene	mg/kg	0.1		0	-	-
			1,2,4-trimethylbenzene	mg/kg	0.1		0	-	-
			sec-butylbenzene	mg/kg	0.1		0	-	-
			p-isopropyltoluene	mg/kg	0.1		0	-	-
			n-butylbenzene	mg/kg	0.1		0	-	-
		Polycyclic	Naphthalene	mg/kg	0.1		0	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-		5.31	-	90
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-		3.97	-	86
			d8-toluene (Surrogate)	mg/kg	-		4.96	-	90
			Bromofluorobenzene (Surrogate)	mg/kg	-		4.51	-	87
		Totals	Total Xylenes	mg/kg	0.3		0	-	-
			Total BTEX	mg/kg	0.6		0.03	-	-
			Total Volatile Chlorinated Hydrocarbons*	mg/kg	3		0	-	-
			Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8		0	-	-
			Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8		0	-	-
		Trihalometha	Chloroform	mg/kg	0.1		0	2.56	78
		nes	Bromodichloromethane	mg/kg	0.1		0	-	-
			Chlorodibromomethane	mg/kg	0.1		0	-	-
			Bromoform	mg/kg	0.1		0	-	-

VOCs in Water

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE177482.002	LB145263.023	Monocyclic	Benzene	µg/L	0.5	0	45.45	114
		Aromatic	Toluene	µg/L	0.5	0.04	45.45	121
			Ethylbenzene	µg/L	0.5	0.02	45.45	118
			m/p-xylene	µg/L	1	0.01	90.9	116
			o-xylene	µg/L	0.5	0.01	45.45	118
		Polycyclic	Naphthalene	µg/L	0.5	0.01	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.74	-	89
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.55	-	91
			d8-toluene (Surrogate)	µg/L	-	5.54	-	94
			Bromofluorobenzene (Surrogate)	µg/L	-	5.03	-	113

Volatile Petroleum Hydrocarbons in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177567.001	LB145187.004		TRH C6-C10	mg/kg	25	35	<25	24.65	101
			TRH C6-C9	mg/kg	20	29	<20	23.2	98
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.9	3.9	-	78
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.6	3.9	-	72
			d8-toluene (Surrogate)	mg/kg	-	3.9	4.8	-	77
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	4.0	-	95
		VPH F	Benzene (F0)	mg/kg	0.1	2.4	<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.

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE177567.001	LB145187.004	VPH F	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	113

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE177482.002	LB145263.023		TRH C6-C10	µg/L	50	0	946.63	102
			TRH C6-C9	µg/L	40	0	818.71	91
		Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.13	-	89
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.91	-	91
			d8-toluene (Surrogate)	µg/L	-	5.33	-	94
			Bromofluorobenzene (Surrogate)	µg/L	-	3.96	-	113
		VPH F	Benzene (F0)	µg/L	0.5	0	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	-0.08	639.67	101

MATRIX SPIKE DUPLICATES

SE177567 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 the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

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

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne**
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	**SE177567 R0**
Date Received	04 Apr 2018
Date Reported	11 Apr 2018

COMMENTS

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

No respirable fibres detected in soil samples using trace analysis technique as per AS 4964-2004.

Asbestos analysed by approved identifiers Ravee Sivasubramaniam.

SIGNATORIES

Akheeqar Beniameen
Chemist

Bennet Lo
Senior Organic Chemist/Metals Chemis

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ravee Sivasubramaniam
Hygiene Team Leader

Shane McDermott
Inorganic/Metals Chemist

ANALYTICAL REPORT

SE177567 R0

RESULTS

Fibre ID in bulk materials — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE177567.009	HA5 FCP	Other	35x30x4mm Cement Sheet Fragment	03 Apr 2018	Amosite & Chrysotile Asbestos Detected	

METHOD SUMMARY

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). The fibres detected may or may not be asbestos fibres.

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%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

E-MAILED
4/4/18 @ 11.40 am

SGS EHS Alexandria Laboratory

SE177567 COC
Received: 04 – Apr – 2018

GEOTECHNIQUE PTY LTD
1 LEMKO PLACE PENRITH NSW 2750 Tel: (02) 4722 2700

CHAIN OF CUSTODY

Results Required by: Normal Turnaround Date: 11/04/2018 Except pH Results Required By 10/04/2018

Your Reference No.:

TO: SGS
UNIT 16, 33 MADDOX STREET
ALEXANDRIA NSW 2015 Tel: 02 8594 0400

Sampled By: **JH** Job No: **13585/4**

Project Manager: **DS** Location: **Drummoyne**

	Location	Depth (m)	Date	Soil	Water	Material	Metals As Cd Cr Cu Pb Hg Ni Zn	pH	CEC	TRH & BTEX	PAH	OCP	Phenols and Cyanides	PCB	Asbestos 0.001% w/w	Asbestos	BTEX	VOC	Herbicides*			
1	HA5	0.0-0.15	03/04/18	SG/SP			✓	✓	✓	✓	✓	✓	✓	✓	✓							
●	HA5	Surface	03/04/18	SP		FCP							✓									
2	HA6	0.1-0.25	03/04/18	SG/SP			✓			✓	✓	✓	✓	✓	✓			✓				
3	HA7	0.05-0.3	03/04/18	SG/SP			✓	✓	✓	✓	✓	✓	✓	✓	✓			✓				
4	HA8	0.0-0.15	03/04/18	SG/SP			✓			✓	✓	✓	✓	✓	✓			✓				
4	HA9	0.2-0.35	03/04/18	SG/SP			✓	✓	✓	✓	✓	✓	✓	✓	✓							
6	D1	-	03/04/18				✓			✓	✓	✓	✓	✓				✓				
7	Rinsate R1		03/04/18		WG/Vial		✓			✓	✓	✓										
8	Trip Spike TS1		03/04/18		Vial												✓					

Relinquished by			Received by			
Name	Signature	Date	Name	Signature	Date	
DANDA SAPKOTA		**04/04/18**			04/04/18 @	1.50

WG: Water sample (glass bottle) SG Soil sample (glass jar) FCP Fibro Cement Piece * 2,4,5-T, 2,4-D, MCPA, MCPB, Mecoprop & Picloram

WP: Water sample (plastic bottle) SP Soil sample (plastic bag) ✓ Test required

SAMPLE RECEIPT ADVICE

SE177567

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne**
Order Number	(Not specified)
Samples	9

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 4/4/2018
Report Due	Wed 11/4/2018
SGS Reference	**SE177567**

SUBMISSION DETAILS

This is to confirm that 9 samples were received on Wednesday 4/4/2018. Results are expected to be ready by COB Wednesday 11/4/2018.
Please quote SGS reference SE177567 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	7 Soil, 1 Water, 1 FCP
Date documentation received	5/4/18@5:39pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.5°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

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

COMMENTS

Results for pH will be reported in SE177567A.

SAMPLE RECEIPT ADVICE

SE177567

CLIENT DETAILS

Client Geotechnique

Project 13585-4 Drummoyne

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Cyanide in soil by Discrete Analyser	Total Phenolics in Soil	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	HA5 0.0-0.15	28	26	11	3	1	10	12	8
002	HA6 0.1-0.25	28	26	11	3	1	10	82	8
003	HA7 0.05-0.3	28	26	11	3	1	10	82	8
004	HA8 0.0-0.15	28	26	11	3	1	10	82	8
005	HA9 0.2-0.35	28	26	11	3	1	10	12	8
006	D1	28	26	11	3	1	10	82	8
008	Trip Spike TS1	-	-	-	-	-	-	12	-

CONTINUED OVERLEAF

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

SAMPLE RECEIPT ADVICE

SE177567

CLIENT DETAILS

Client Geotechnique

Project 13585-4 Drummoyne

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	Fibre ID in bulk materials	Gravimetric Determination of Asbestos in Soil	Mercury in Soil	Moisture Content	Total Recoverable Elements in Soil/Waste
001	HA5 0.0-0.15	13	-	9	1	1	7
002	HA6 0.1-0.25	-	-	9	1	1	7
003	HA7 0.05-0.3	13	-	9	1	1	7
004	HA8 0.0-0.15	-	-	9	1	1	7
005	HA9 0.2-0.35	13	-	9	1	1	7
006	D1	-	-	-	1	1	7
009	HA5 FCP Surface	-	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

SE177567

CLIENT DETAILS

Client Geotechnique

Project 13585-4 Drummoyne

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Metals in Water (Dissolved) by ICPOES	OC Pesticides in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
007	Rinsate R1	1	7	28	23	9	12	8

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	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne - pH**
Order Number	(Not specified)
Samples	9

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	**SE177567A R0**
Date Received	4/4/2018
Date Reported	10/4/2018

COMMENTS

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

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

pH in soil (1:5) [AN101] Tested: 9/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567A.001	HA7 SOIL 0.05-0.3 3/4/2018 SE177567A.003	HA9 SOIL 0.2-0.35 3/4/2018 SE177567A.005
pH	pH Units	0.1	**7.2**	**6.6**	**7.6**

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%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

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Any 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 only. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law .

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STATEMENT OF QA/QC PERFORMANCE

SE177567A R0

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne - pH**
Order Number	(Not specified)
Samples	9

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	**SE177567A R0**
Date Received	04 Apr 2018
Date Reported	10 Apr 2018

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

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Soil
Date documentation received	5/4/18@5:39pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.5°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE177567A 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
HA5	SE177567A.001	LB145205	03 Apr 2018	04 Apr 2018	10 Apr 2018	09 Apr 2018	10 Apr 2018	10 Apr 2018
HA7	SE177567A.003	LB145205	03 Apr 2018	04 Apr 2018	10 Apr 2018	09 Apr 2018	10 Apr 2018	10 Apr 2018
HA9	SE177567A.005	LB145205	03 Apr 2018	04 Apr 2018	10 Apr 2018	09 Apr 2018	10 Apr 2018	10 Apr 2018

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 %
SE177584.010	LB145205.014	pH	pH Units	0.1	5.902	6.152	32	4
SE177634.005	LB145205.023	pH	pH Units	0.1	5.436	5.517	32	1

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 %
LB145205.003	pH	pH Units	0.1	7.4	7.415	98 - 102	100

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

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

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE177567A 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 the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

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

E-MAILED
5/4/18 @ 5.39p

SGS EHS Alexandria Laboratory

SE177567A COC
Received: 04 – Apr – 2018

GEOTECHNIQUE PTY LTD
1 LEMKO PLACE PENRITH NSW 2750 Tel: (02) 4722 2700

CHAIN OF CUSTODY

Results Required by: Normal Turnaround Date: 11/04/2018 Except pH Results Required By 10/04/2018

Your Reference No.:

TO: SGS
UNIT 16, 33 MADDOX STREET
ALEXANDRIA NSW 2015 Tel: 02 8594 0400

Sampled By: **JH** Job No: **13585/4**

Project Manager: **DS** Location: **Drummoyne**

	Location	Depth (m)	Date	Soil	Water	Material	Metals As Cd Cr Cu Pb Hg Ni Zn	pH	CEC	TRH & BTEX	PAH	OCP	Phenols and Cyanides	PCB	Asbestos 0.001% w/w	Asbestos	BTEX	VOC	Herbicides*			
1	HA5	0.0-0.15	03/04/18	SG/SP			✓	✓	✓	✓	✓	✓	✓	✓	✓							
9	HA5	Surface	03/04/18	SP		FCP										✓						
2	HA6	0.1-0.25	03/04/18	SG/SP			✓			✓	✓	✓	✓	✓	✓			✓				
3	HA7	0.05-0.3	03/04/18	SG/SP			✓	✓	✓	✓	✓	✓	✓	✓	✓			✓				
4	HA8	0.0-0.15	03/04/18	SG/SP			✓			✓	✓	✓	✓	✓	✓			✓				
5	HA9	0.2-0.35	03/04/18	SG/SP			✓	✓	✓	✓	✓	✓	✓	✓	✓							
6	D1	-	03/04/18				✓			✓	✓	✓	✓	✓				✓				
7	Rinsate R1		03/04/18		WG/Vial		✓			✓	✓	✓										
8	Trip Spike TS1		03/04/18		Vial												✓					

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
DANDA SAPKOTA		04/04/18			4/4/18 @ 1.50p

WG: Water sample (glass bottle) SG Soil sample (glass jar) FCP Fibro Cement Piece * 2,4,5-T, 2,4-D, MCPA, MCPB, Mecoprop & Picloram

WP: Water sample (plastic bottle) SP Soil sample (plastic bag) ✓ Test required

SAMPLE RECEIPT ADVICE

SE177567A

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne - pH**
Order Number	(Not specified)
Samples	9

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 4/4/2018
Report Due	Tue 10/4/2018
SGS Reference	**SE177567A**

SUBMISSION DETAILS

This is to confirm that 9 samples were received on Wednesday 4/4/2018. Results are expected to be ready by COB Tuesday 10/4/2018. Please quote SGS reference SE177567A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Soil
Date documentation received	5/4/18@5:39pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.5°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE177567A

CLIENT DETAILS

Client Geotechnique

Project 13585-4 Drummoyne - pH

SUMMARY OF ANALYSIS

No.	Sample ID	pH in soil (1:5)
001	HA5 0.0-0.15	1
003	HA7 0.05-0.3	1
005	HA9 0.2-0.35	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	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne Additional**
Order Number	(Not specified)
Samples	9

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	**SE177567B R0**
Date Received	12/4/2018
Date Reported	17/4/2018

COMMENTS

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

SIGNATORIES

Akheeqar Beniameen
Chemist

Kamrul Ahsan
Senior Chemist

TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC [AN006] Tested: 16/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567B.001
pH 1:20	pH Units	-	**6.5**
pH 1:20 plus HCL	pH Units	-	**1.7**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**25**
Volume of ExtractionSolution Used*	mL	-	**500**
pH TCLP after 18 hours	pH Units	-	**5.0**

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract [AN420] Tested: 13/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567B.001
Benzo(a)pyrene	µg/L	0.1	<0.1

Metals in TCLP Extract by ICPOES [AN320] Tested: 16/4/2018

PARAMETER	UOM	LOR	HA5 SOIL 0.0-0.15 3/4/2018 SE177567B.001
Lead, Pb	mg/L	0.02	**0.11**

METHOD	METHODOLOGY SUMMARY
AN006	Contaminants of interest in a waste material are leached out of the waste with a selected leaching solution under controlled conditions. The ratio of sample to extraction fluid is 100g to 2L (1 to 20 by mass). The concentration of each contaminant of interest is determined in the leachate by appropriate methods after separation from the sample by filtering. Base on USEPA 1311.
AN006	Extraction Fluid #1: This fluid is made by combining 128.6mL of dilute sodium hydroxide solution and 11.5mL glacial acetic acid with water and diluting to a volume of 2 litres. The pH of this fluid should be 4.93 ± 0.05.
AN006	Extraction Fluid #2: This fluid is made by diluting 5.7mL glacial acetic acid with water to a volume of 1 litre. The pH of this fluid should be 2.88 ± 0.05.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN320	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	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.
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).

FOOTNOTES

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

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

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

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

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

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

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

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

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

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Any 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 only. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law .

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STATEMENT OF QA/QC PERFORMANCE

SE177567B R0

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne Additional**
Order Number	(Not specified)
Samples	9

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	**SE177567B R0**
Date Received	12 Apr 2018
Date Reported	17 Apr 2018

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

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	1 Soil
Date documentation received	12/4/18@11:52am	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.5°C	Sufficient sample for analysis	Yes
Turnaround time requested	Three Days		

HOLDING TIME SUMMARY

SE177567B 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.

Metals in TCLP Extract by ICPOES

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567B.001	LB145778	03 Apr 2018	12 Apr 2018	30 Sep 2018	16 Apr 2018	30 Sep 2018	17 Apr 2018

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567B.001	LB145633	03 Apr 2018	12 Apr 2018	24 Apr 2018	13 Apr 2018	23 May 2018	17 Apr 2018

TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC

Method: ME-(AU)-[ENV]AN006

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA5	SE177567B.001	LB145751	03 Apr 2018	12 Apr 2018	17 Apr 2018	16 Apr 2018	17 Apr 2018	17 Apr 2018

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	HA5	SE177567B.001	%	40 - 130%	44
d14-p-terphenyl (Surrogate)	HA5	SE177567B.001	%	40 - 130%	54
d5-nitrobenzene (Surrogate)	HA5	SE177567B.001	%	40 - 130%	44

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.

Metals in TCLP Extract by ICPOES

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

Sample Number	Parameter	Units	LOR	Result
LB145778.001	Lead, Pb	mg/L	0.02	<0.02

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Sample Number		Parameter	Units	LOR	Result
LB145633.001		Benzo(a)pyrene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	46
		2-fluorobiphenyl (Surrogate)	%	-	44
		d14-p-terphenyl (Surrogate)	%	-	56

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.

No duplicates were required for this job.

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.

Metals in TCLP Extract by ICPOES

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145778.002	Lead, Pb	mg/L	0.02	2.0	2	80 - 120	101

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145633.002		Benzo(a)pyrene	µg/L	0.1	36	40	60 - 140	89
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.5	40 - 130	60
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	64
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	74

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 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 the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

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

E-MAILED
12/4/18 @ 1:45 pm

SGS EHS Alexandria Laboratory

SE177567B COC
Received: 12 – Apr – 2018

GEOTECHNIQUE PTY LTD
1 LEMKO PLACE PENRITH NSW 2750 Tel: (02) 4722 2700

CHAIN OF CUSTODY

Results Required by: 3 days **Date: 17/04/2018**

Your Reference No.: SE177567

TO: SGS
UNIT 16, 33 MADDOX STREET
ALEXANDRIA NSW 2015 Tel: 02 8594 0400

Sampled By: **JH** Job No: **13585/4**

Project Manager: **DS** Location: **Drummoyne**

	Location	Depth (m)	Date	Soil	Water	Material	Metals As Cd Cr Cu Pb Hg Ni Zn	TCLP Pb	TCLP BAP												
1	HA5	0.0-0.15	03/04/18	SG/SP				✓	✓												

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
DANDA SAPKOTA		12/04/18	A. Odisino		12/4/18

WG: Water sample (glass bottle) SG Soil sample (glass jar) FCP Fibro Cement Piece
WP: Water sample (plastic bottle) SP Soil sample (plastic bag) ✓ Test required

* 2,4,5-T, 2,4-D, MCPA, MCPB, Mecoprop & Picloram

SAMPLE RECEIPT ADVICE

SE177567B

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne Additional**
Order Number	(Not specified)
Samples	9

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	Thu 12/4/2018
Report Due	Tue 17/4/2018
SGS Reference	**SE177567B**

SUBMISSION DETAILS

This is to confirm that 9 samples were received on Thursday 12/4/2018. Results are expected to be ready by COB Tuesday 17/4/2018. Please quote SGS reference SE177567B when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	1 Soil
Date documentation received	12/4/18@11:52am	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.5°C	Sufficient sample for analysis	Yes
Turnaround time requested	Three Days		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE177567B

CLIENT DETAILS

Client Geotechnique

Project 13585-4 Drummoyne Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in TCLP Extract by ICPOES	PAH (Polynuclear Aromatic Hydrocarbons) in TCLP	TCLP (Toxicity Characteristic Leaching
001	HA5 0.0-0.15	1	4	6

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	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne Additional**
Order Number	(Not specified)
Samples	9

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	**SE177567C R0**
Date Received	13/4/2018
Date Reported	18/4/2018

COMMENTS

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

SIGNATORIES

Kamrul Ahsan
Senior Chemist

TCLP (Toxicity Characteristic Leaching Procedure) for Metals [AN006] Tested: 17/4/2018

PARAMETER	UOM	LOR	HA7 SOIL 0.05-0.3 3/4/2018 SE177567C.003	HA9 SOIL 0.2-0.35 3/4/2018 SE177567C.005
pH 1:20	pH Units	-	**7.4**	**7.3**
pH 1:20 plus HCL	pH Units	-	**1.6**	**1.6**
Extraction Solution Used	No unit	-	**1**	**1**
Mass of Sample Used*	g	-	**13**	**13**
Volume of ExtractionSolution Used*	mL	-	**250**	**250**
pH TCLP after 18 hours	pH Units	-	**4.9**	**4.9**

Metals in TCLP Extract by ICPOES [AN320] Tested: 17/4/2018

PARAMETER	UOM	LOR	HA7 SOIL 0.05-0.3 3/4/2018 SE177567C.003	HA9 SOIL 0.2-0.35 3/4/2018 SE177567C.005
Nickel, Ni	mg/L	0.005	**0.083**	-
Lead, Pb	mg/L	0.02	-	**0.08**

METHOD	METHODOLOGY SUMMARY
AN006	Contaminants of interest in a waste material are leached out of the waste with a selected leaching solution under controlled conditions. The ratio of sample to extraction fluid is 100g to 2L (1 to 20 by mass). The concentration of each contaminant of interest is determined in the leachate by appropriate methods after separation from the sample by filtering. Base on USEPA 1311.
AN006	Extraction Fluid #1: This fluid is made by combining 128.6mL of dilute sodium hydroxide solution and 11.5mL glacial acetic acid with water and diluting to a volume of 2 litres. The pH of this fluid should be 4.93 ± 0.05.
AN006	Extraction Fluid #2: This fluid is made by diluting 5.7mL glacial acetic acid with water to a volume of 1 litre. The pH of this fluid should be 2.88 ± 0.05.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN320	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	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.

FOOTNOTES

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

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

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

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

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

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

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

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

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

STATEMENT OF QA/QC PERFORMANCE

SE177567C R0

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne Additional**
Order Number	(Not specified)
Samples	9

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	**SE177567C R0**
Date Received	13 Apr 2018
Date Reported	18 Apr 2018

COMMENTS

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

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

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

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SE177567C 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.

Metals in TCLP Extract by ICPOES

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA7	SE177567C.003	LB145889	03 Apr 2018	13 Apr 2018	30 Sep 2018	17 Apr 2018	30 Sep 2018	18 Apr 2018
HA9	SE177567C.005	LB145889	03 Apr 2018	13 Apr 2018	30 Sep 2018	17 Apr 2018	30 Sep 2018	18 Apr 2018

TCLP (Toxicity Characteristic Leaching Procedure) for Metals

Method: ME-(AU)-[ENV]AN006

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HA7	SE177567C.003	LB145847	03 Apr 2018	13 Apr 2018	30 Sep 2018	17 Apr 2018	30 Sep 2018	18 Apr 2018
HA9	SE177567C.005	LB145847	03 Apr 2018	13 Apr 2018	30 Sep 2018	17 Apr 2018	30 Sep 2018	18 Apr 2018

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.

Metals in TCLP Extract by ICPOES — **Method: ME-(AU)-[ENV]AN320**

Sample Number	Parameter	Units	LOR	Result
LB145889.001	Lead, Pb	mg/L	0.02	<0.02
	Nickel, Ni	mg/L	0.005	<0.005

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.

No duplicates were required for this job.

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.

Metals in TCLP Extract by ICPOES — **Method: ME-(AU)-[ENV]AN320**

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB145889.002	Lead, Pb	mg/L	0.02	2.1	2	80 - 120	104
	Nickel, Ni	mg/L	0.005	2.1	2	80 - 120	105

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

SE177567C 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 the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

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

SAMPLE RECEIPT ADVICE

SE177567C

CLIENT DETAILS

Contact	Danda Sapkota
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	danda.sapkota@geotech.com.au
Project	**13585-4 Drummoyne Additional**
Order Number	(Not specified)
Samples	9

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 13/4/2018
Report Due	Wed 18/4/2018
SGS Reference	**SE177567C**

SUBMISSION DETAILS

This is to confirm that 9 samples were received on Friday 13/4/2018. Results are expected to be ready by COB Wednesday 18/4/2018. Please quote SGS reference SE177567C when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	2 Soil
Date documentation received	13/4/18@1:51pm	Type of documentation received	Email
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	11.5°C	Sufficient sample for analysis	Yes
Turnaround time requested	Three Days		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE177567C

CLIENT DETAILS

Client Geotechnique

Project 13585-4 Drummoyne Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in TCLP Extract by ICPOES	TCLP (Toxicity Characteristic Leaching
003	HA7 0.05-0.3	1	6
005	HA9 0.2-0.35	1	6

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 .

E-MAILED
13/4/18@1.51

SGS EHS Alexandria Laboratory

SE177567C COC
Received: 13 – Apr – 2018

GEOTECHNIQUE PTY LTD
1 LEMKO PLACE PENRITH NSW 2750 Tel: (02) 4722 2700

CHAIN OF CUSTODY

Results Required by: 3 days **Date: 18/04/2018**

Your Reference No.: SE177567

TO: SGS
UNIT 16, 33 MADDOX STREET
ALEXANDRIA NSW 2015 Tel: 02 8594 0400

Sampled By: **JH** Job No: **13585/4**

Project Manager: **DS** Location: **Drummoyne**

	Location	Depth (m)	Date	Soil	Water	Material	Metals As Cd Cr Cu Pb Hg Ni Zn	TCLP Ni	TCLP Pb													
#3	HA7	0.05-0.3	03/04/18	SG/SP				✓														
5	HA9	0.2-0.35	03/04/18	SG/SP					✓													

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
DANDA SAPKOTA		13/04/18	A. Odisho		13/4/18

WG: Water sample (glass bottle) SG Soil sample (glass jar) FCP Fibro Cement Piece * ~~2,4,5-T~~, 2,4-D, MCPA, MCPB, Mecoprop & Picloram

WP: Water sample (plastic bottle) SP Soil sample (plastic bag) ✓ Test required

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

CERTIFICATE OF ANALYSIS 188726

Client Details

Client	Geotechnique Pty Ltd
Attention	Danda Saptoka
Address	PO Box 880, Penrith, NSW, 2751

Sample Details

Your Reference	**13585/4, Drummoyne**
Number of Samples	1 soil
Date samples received	04/04/2018
Date completed instructions received	04/04/2018

Analysis Details

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

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

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

Report Details

Date results requested by	11/04/2018
Date of Issue	10/04/2018

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals

Authorised By

Jacinta Hurst, Laboratory Manager

VOCs in soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date extracted	-	05/04/2018
Date analysed	-	06/04/2018
Dichlorodifluoromethane	mg/kg	<1
Chloromethane	mg/kg	<1
Vinyl Chloride	mg/kg	<1
Bromomethane	mg/kg	<1
Chloroethane	mg/kg	<1
Trichlorofluoromethane	mg/kg	<1
1,1-Dichloroethene	mg/kg	<1
trans-1,2-dichloroethene	mg/kg	<1
1,1-dichloroethane	mg/kg	<1
cis-1,2-dichloroethene	mg/kg	<1
bromochloromethane	mg/kg	<1
chloroform	mg/kg	<1
2,2-dichloropropane	mg/kg	<1
1,2-dichloroethane	mg/kg	<1
1,1,1-trichloroethane	mg/kg	<1
1,1-dichloropropene	mg/kg	<1
Cyclohexane	mg/kg	<1
carbon tetrachloride	mg/kg	<1
Benzene	mg/kg	<0.2
dibromomethane	mg/kg	<1
1,2-dichloropropane	mg/kg	<1
trichloroethene	mg/kg	<1
bromodichloromethane	mg/kg	<1
trans-1,3-dichloropropene	mg/kg	<1
cis-1,3-dichloropropene	mg/kg	<1
1,1,2-trichloroethane	mg/kg	<1
Toluene	mg/kg	<0.5
1,3-dichloropropane	mg/kg	<1
dibromochloromethane	mg/kg	<1
1,2-dibromoethane	mg/kg	<1
tetrachloroethene	mg/kg	<1
1,1,1,2-tetrachloroethane	mg/kg	<1
chlorobenzene	mg/kg	<1
Ethylbenzene	mg/kg	<1
bromoform	mg/kg	<1

VOCs in soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
m+p-xylene	mg/kg	<2
styrene	mg/kg	<1
1,1,2,2-tetrachloroethane	mg/kg	<1
o-Xylene	mg/kg	<1
1,2,3-trichloropropane	mg/kg	<1
isopropylbenzene	mg/kg	<1
bromobenzene	mg/kg	<1
n-propyl benzene	mg/kg	<1
2-chlorotoluene	mg/kg	<1
4-chlorotoluene	mg/kg	<1
1,3,5-trimethyl benzene	mg/kg	<1
tert-butyl benzene	mg/kg	<1
1,2,4-trimethyl benzene	mg/kg	<1
1,3-dichlorobenzene	mg/kg	<1
sec-butyl benzene	mg/kg	<1
1,4-dichlorobenzene	mg/kg	<1
4-isopropyl toluene	mg/kg	<1
1,2-dichlorobenzene	mg/kg	<1
n-butyl benzene	mg/kg	<1
1,2-dibromo-3-chloropropane	mg/kg	<1
1,2,4-trichlorobenzene	mg/kg	<1
hexachlorobutadiene	mg/kg	<1
1,2,3-trichlorobenzene	mg/kg	<1
Surrogate Dibromofluorometha	%	126
Surrogate aaa-Trifluorotoluene	%	82
Surrogate Toluene-d_8	%	98
Surrogate 4-Bromofluorobenzene	%	98

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date extracted	-	05/04/2018
Date analysed	-	06/04/2018
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	92

svTRH (C10-C40) in Soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date extracted	-	05/04/2018
Date analysed	-	06/04/2018
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	82

PAHs in Soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date extracted	-	05/04/2018
Date analysed	-	05/04/2018
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.07
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	0.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	101

Organochlorine Pesticides in soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date extracted	-	05/04/2018
Date analysed	-	06/04/2018
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	101

PCBs in Soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date extracted	-	05/04/2018
Date analysed	-	06/04/2018
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCLMX	%	101

Acid Extractable metals in soil		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date prepared	-	05/04/2018
Date analysed	-	05/04/2018
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	14
Copper	mg/kg	23
Lead	mg/kg	62
Mercury	mg/kg	0.1
Nickel	mg/kg	7
Zinc	mg/kg	50

Misc Soil - Inorg		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date prepared	-	05/04/2018
Date analysed	-	05/04/2018
Total Cyanide	mg/kg	<0.5
Total Phenolics (as Phenol)	mg/kg	<5

Moisture		
Our Reference		188726-1
Your Reference	UNITS	Split S1
Date Sampled		03/04/2018
Type of sample		soil
Date prepared	-	05/04/2018
Date analysed	-	06/04/2018
Moisture	%	21

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-014	Cyanide - free, total, weak acid dissociable by segmented flow analyser (in line dialysis with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: VOCs in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			06/04/2018	[NT]	[NT]	[NT]	[NT]	06/04/2018	[NT]
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
bromochloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
chloroform	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
2,2-dichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
1,1-dichloropropene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
carbon tetrachloride	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	mg/kg	0.2	Org-014	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
dibromomethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
trichloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	77	[NT]
bromodichloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	mg/kg	0.5	Org-014	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
dibromochloromethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
1,2-dibromoethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
tetrachloroethene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
chlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
bromoform	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-014	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
styrene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
o-Xylene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
isopropylbenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
bromobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
tert-butyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
sec-butyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
hexachlorobutadiene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluorometha	%		Org-014	129	[NT]	[NT]	[NT]	[NT]	126	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-014	87	[NT]	[NT]	[NT]	[NT]	74	[NT]
Surrogate Toluene-d_8	%		Org-014	98	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-014	97	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			06/04/2018	[NT]	[NT]	[NT]	[NT]	06/04/2018	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	75	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	75	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	78	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	79	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	71	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	78	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	98	[NT]	[NT]	[NT]	[NT]	83	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			06/04/2018	[NT]	[NT]	[NT]	[NT]	06/04/2018	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
Surrogate o-Terphenyl	%		Org-003	83	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	128	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	94	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			06/04/2018	[NT]	[NT]	[NT]	[NT]	06/04/2018	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	70	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	96	[NT]	[NT]	[NT]	[NT]	115	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			06/04/2018	[NT]	[NT]	[NT]	[NT]	06/04/2018	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCLMX	%		Org-006	96	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	109	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	106	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Date analysed	-			05/04/2018	[NT]	[NT]	[NT]	[NT]	05/04/2018	[NT]
Total Cyanide	mg/kg	0.5	Inorg-014	<0.5	[NT]	[NT]	[NT]	[NT]	105	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	103	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: <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.

Measurement Uncertainty estimates are available for most tests upon request.

ENVIROLAB GROUP
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 188726
Date Received: 4/4/2018
Time Received: 1700
Received by: R
Temp: Cool/Ambient
Cooling: Ice/Icepack 4.2
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

PH: 02 9910 6200 FAX: 02 9910 6201

ATTN: MS AILEEN HIE

Sampling By: JH
Job No: 13585/4
Project:
Project Manager: DS
Location: Drummoyne

Sampling details				Sample type		Results required by: Normal Turnaround Time									
Location	Depth (m)	Date	Time	Soil	Water	Heavy Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	PHENOLS	CYANIDE	Combo No	VOC	KEEP SAMPLE
(1) Split S1		03/04/2018	-	SG		✓	✓	✓	✓	✓	✓	✓	9	✓	YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
DANDA SAPOKOTA		04/04/2018			4/4/2018

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

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Geotechnique Pty Ltd
Attention	Danda Saptoka

Sample Login Details

Your reference	13585/4, Drummoyne
Envirolab Reference	188726
Date Sample Received	04/04/2018
Date Instructions Received	04/04/2018
Date Results Expected to be Reported	11/04/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	4.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	VOCs in soil	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	PCBsin Soil	Acid Extractable metalsin soil	Total Cyanide	Total Phenolics (as Phenol)
Split S1	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

Additional Info

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

APPENDIX G

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 either 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 the 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 both 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 may not detect all contamination within a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which 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.