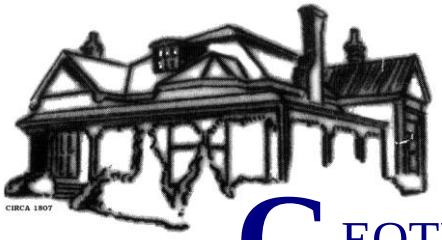

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DETAILED CONTAMINATION ASSESSMENT & REMEDIAL ACTION PLAN

PROPOSED RESIDENTIAL DEVELOPMENT
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

REPORT NO 13704/2-AA 14 JULY 2016

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ABN 64 002 841 063

Job No: 13704/2
Our Ref: 13704/2-AA
14 July 2016

Astina Group
150 High Street
PENRITH NSW 2750
Email: William@astina.com.au

Attention: Mr W Schrumpf

Dear Sir

re **Proposed Residential Development**
Lot 101 in DP1031340
21-25 Woodriff Street, Penrith
Detailed Contamination Assessment and Remedial Action Plan

Further to our preliminary contamination assessment (PCA) Report 13704/1-AA dated 11 May 2016, please find herewith our Detailed Contamination Assessment (DCA) and Remedial Action Plan (RAP) for the above property. The report also includes waste classification of fill materials.

Reference should be made to Executive Summary.

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

Yours faithfully
GEOTECHNIQUE PTY LTD

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

GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

EXECUTIVE SUMMARY

Further to the preliminary contamination assessment (PCA) Report 13704/1-AA dated 11 May 2016, prepared by Geotechnique Pty Ltd (Geotechnique), this executive summary presents a synopsis of the Detailed Contamination Assessment (DCA) and Remedial Action Plan (RAP) for a parcel of land currently registered as Lot 101 in DP1031340 located at 21-25 Woodriff Street, Penrith, in the local government area of Penrith as shown on Figure 1, page 1 of the report and hereafter referred as site. The report also includes waste classification of fill materials.

We understand that the proposed development of the site includes the construction of a residential building with one to two levels of basement car park.

The objective of the DCA was to delineate the extent of metals, TPH, PAH and/or asbestos contaminated fill materials within the site as well as determination of the coal tar status of bitumen identified within the site and the purpose of the RAP was to provide details for remediation and validation of the site. The purpose of the waste classification was to classify the fill materials for landfill disposal.

The scope of work included review of the PCA report, detailed systematic sampling and testing of soil across the site as a part of DCA, developing suitable remediation and validation strategies for the site, and preparation of this report.

As shown on Drawing No 13704/2-AA1, the site is trapezoidal in shape, and covers an area of 2,005 square metres (m^2). The southern portion of the site (a right of carriageway and easement for services) was not part of the current contamination assessment, as shown on Drawing No 13704/2-AA1.

Based on the PCA and DCA, one indicative remediation area (Area 1) has been developed as shown on Drawing No 13704/2-AA3, removal of contaminated soils from indicative Area 1 will be required.

Following completion of removal of contaminated soils from Area 1, a WorkCover licensed asbestos assessor must be engaged to issue clearance report for Area 1 by undertaking appropriate inspection, sampling and testing.

Following the clearance of Area 1, an Environmental Consultant must be engaged to carry out Validation sampling and testing to ensure complete removal of PAH, TPH and Metals contamination. A thorough visual inspection of the excavation pit in Area 1 must also be carried out to confirm that no soil with unacceptable odour or discoloration remains in the pit.

Following completion of remediation works, if excess fill materials in the site requiring removal from the site, could be removed under General Solid Waste classification and must be transported and disposed of at an EPA licensed landfill facility. Removal and disposal of the waste must be carried out in accordance with the requirements of the regulators, such as NSW WorkCover and NSW EPA.

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For any natural soil beneath the fill materials to be excavated and removed from the site, it is recommended that classification of natural soil in accordance with the NSW EPA guidelines for the resource recovery exemptions under the Protection of the Environment Operations (Waste) Regulation 2005 is undertaken, following completion of removal of all fill materials from the site, for potential re-use at other development sites.

Reference must be made to the full report for more details of the remediation process, including necessary licensing, occupational health & safety measures and environmental management protocols.

Reference should be made to Section 18.0 of the report for the conclusion and recommendations. Reference should be made to Section 19.0 of the report and Appendix G, which set out details of the limitations of the assessment.

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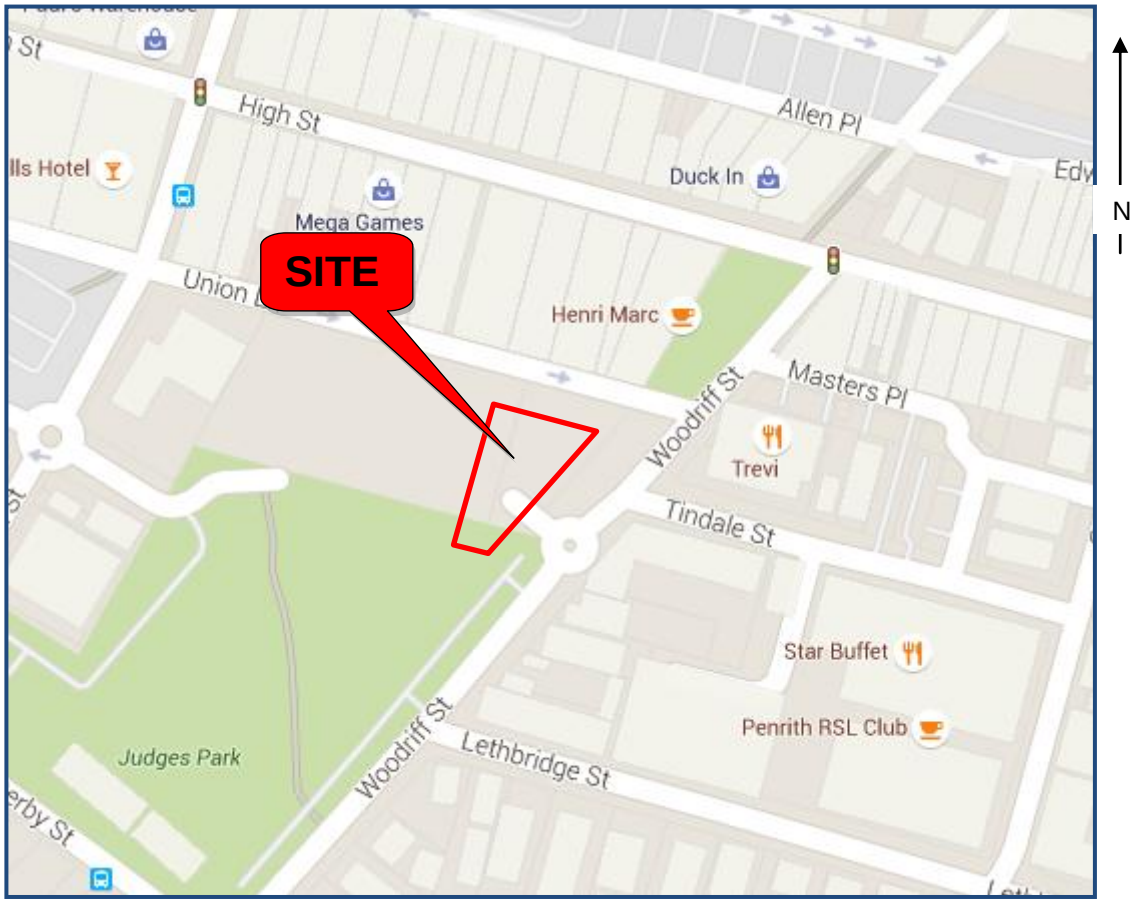
1.0 INTRODUCTION

Further to the preliminary contamination assessment (PCA) Report 13704/1-AA dated 11 May 2016, prepared by Geotechnique Pty Ltd (Geotechnique) and as requested, we have completed a Detailed Contamination Assessment (DCA) and Remedial Action Plan (RAP) for a parcel of land currently registered as Lot 101 in DP1031340 located at 21-25 Woodriff Street, Penrith, in the local government area of Penrith as indicated on Figure 1 below and hereafter referred as site. The report also includes waste classification of fill materials.

FIGURE 1



Map Data ©2016 Google

We understand that the proposed development of the site includes the construction of a residential building with one to two levels of basement car park.

The objective of the DCA was to delineate the extent of metals, TPH, PAH and/or asbestos contaminated fill materials within the site as well as determination of the coal tar status of bitumen identified within the site and the purpose of the RAP was to provide details for remediation and validation of the site. The purpose of the waste classification was to classify the fill materials for landfill disposal.

This report was prepared generally in accordance with the NSW Environment Protection Authority (EPA), "Guidelines for Consultants Reporting on Contaminated Sites" – 2011, and to satisfy State Environmental Planning Policy No. 55 – Contaminated Land (SEPP55).

2.0 SCOPE OF WORK

In order to achieve the objectives of the DCA, waste classification of fill materials and RAP, the following scope of work was conducted:

- Review of the PCA report.
- Soil sampling by the Field Engineer from Geotechnique in the vicinity of metals, TPH, PAH and/or asbestos contaminated locations identified during the PCA. Standard quality assurance (QA) and quality control (QC) measures were implemented.
- Chemical and asbestos analysis by laboratories accredited by the National Association of Testing Authorities (NATA), in accordance with Chains of Custody (COC) prepared by Geotechnique.
- Assessment of the laboratory analytical results.
- Assessment of laboratory and field QA/QC.
- Classification of the fill materials for landfill disposal in accordance with the NSW Department of Environment and Climate Change (DECC) *Waste Classification Guidelines,* December 2009.
- Developing suitable remedial and validation strategies for the site.
- Preparation of this report

3.0 SITE INFORMATION

The site is located at 21-25 Woodriff Street, Penrith, in the local government area of Penrith City Council and is registered as Lot 101 in DP1031340.

As shown on Drawing No 13704/2-AA1, the site is trapezoidal in shape, and covers an area of 2,005 square metres (m^2).

At the time of conducting field sampling for the DCA (15 June 2016), the site was vacant, however the site was temporarily fenced off for the field work otherwise the subject site is a public car park. The ground surface is mostly covered by bitumen, and a grassy / bare ground area at the north eastern portion of the site. There were no obvious ash materials, fibro-cement pieces on the bare ground surface that would indicate the potential for contamination. There were no obvious features associated with any underground storage tanks (bowser, breather pipe, inlet valve and piping). The site conditions remain almost the same as observed during the PCA (March 2016).

The southern portion of the site (a right of carriageway and easement for services) was not part of the current contamination assessment.

The site is bound by Union Land to the north, Woodriff Street to the east, a car park to the south and a multi-story car park to the west

4.0 TOPOGRAPHY, GEOLOGY & HYDROGEOLOGY

In general, ground surface is flat but on the southern portion there is a slope from east to west.

The Geological Map of Penrith (Geological Series Sheet 9030, Scale 1:100,000, Edition 1, 1991) published by the Department of Minerals and Energy indicates that the residual soils within the site to be underlain by Quaternary Age soils of the Cranebrook Formation, comprising of gravel, sand, silt and clay.

The Soil Landscape Map of Penrith (soil Landscape Series Sheet 9030, Scale 1:100,000, 1989), prepared by the Soil Conservation Service of NSW, indicates that the site is located within the Richmond landscape area and typically consists of clays, clay loams, sands and ironstone nodules.

Reference should be made to Table 1 in Appendix A for descriptions of the soils encountered during sampling for the DCA. In general, the following profile was identified during field work for the PCA and DCA.

Fill	Type 1: Mixture of silty clay, low to medium plasticity, dark grey, gravel and bitumen was found from ground level to 150mm below excavated ground level (EGL) in TP1, TP2, TP3, TP4, TP5, and TP7, underlain by Type 2 or Type 3 fill. Type 2: Silty clay, medium plasticity, pale brown was found underlying type 1 fill with depths ranging from ground surface to 900mm below EGL in TP1. TP2, TP3, TP5, TP6, TP7, TP8, TP9, TP11 and TP12 underlain by natural clayey soil. Type 3: Silty clay, medium plasticity, brown with inclusion of gravel was found underlying type 1 fill in a depth range of 150mm - 800mm below EGL in TP4, TP10, TP13 and TP14 underlain by natural clayey soil. Type 4: Mixture of silty clay, low plasticity, dark grey, and gravel was found underlying type 1 fill in a depth range of 50mm - 300mm below EGL in TP10, TP11, TP13 and TP14 underlain by underlain by Type 2 or Type 3 fill. Based on the contents of the fill materials, the natural soil profiles and regional geological information, it appears that the all fill materials appears to have been imported to the site.
Natural Soil	Clay, high plasticity, pale brown was encountered beneath the fill materials.

There were no obvious ash materials, fibro-cement pieces, odour or discolouration at the sampling locations.

The closest waterbody is Peach Tree Creek, which is located approximately 1km to the west of the site. Based on observation and site topography, surface run-off would predominantly flow to the west towards the multi- story car park. Obvious local depressions that might capture or divert stormwater run-off which was were not observed within the site.

Groundwater or perched water was not encountered during sampling to a maximum depth of about 1.4m below EGL, during the short period the test pit locations remained open. However, it should be noted that groundwater levels might vary due to rainfall and other factors not evident during field work.

A site-specific groundwater analysis was outside the scope of this assessment.

5.0 SITE HISTORY INFORMATION

Geotechnique carried out a review of site history information as part of the PCA. The review included historical aerial photographs, current certificates of land titles, Planning Certificates issued by Council under Section 149 of the Environmental Planning and Assessment Act 1979, NSW EPA records regarding notices for contaminated land, SafeWork NSW information pertaining to storage of dangerous goods and Council records. For details, reference should be made to Report 13704/1-AA.

Review of historical aerial photographs indicates that the site and adjoining properties were commercial land since at least the 1940s and then changes into public car park after 2002.

NSW Department of Lands records indicate that private proprietors owned the site in the past. Penrith City Council has owned the site since 1970/1989.

The Section 149 (2) Planning Certificate (Certificate No: 16/01337) during the PCA and recently obtained Section 149 (2 & 5) Planning Certificate (Certificate No: 16/02879) revealed no matters arising under the Contaminated Land Management Act 1997. Reference may be made to Appendix B for the Section 149 (2 & 5) Certificate.

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

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

The Council records show a number of development consent approval between 1984 and 1992 for erection of office / garden shed / outbuildings / detached colour bond steel / other residential building at 21 Woodriff Street, Penrith.

6.0 SUMMARY OF THE PRELIMINARY CONTAMINATION ASSESSMENT (PCA) REPORT

Results of the PCA for a parcel of land currently registered Lot 101 in DP1031340 located at 21-25 Woodriff Street, Penrith, was presented in Report No 13704/1-AA dated 11 May 2016.

It is understood that the proposed development of the site includes the construction of a residential building with one to two levels of basement car park.

At the time of inspection by a Field Engineer from Geotechnique on 18 March 2016, the site was vacant, however the site was temporarily fenced off for the field work otherwise the subject site is a public car park. The ground surface is mostly covered by bitumen, and a grassy / bare ground area at the north eastern portion of the site. There were no obvious ash materials, fibro-cement pieces on the bare ground surface that would indicate the potential for contamination. There were no obvious features associated with any underground storage tanks (bowser, breather pipe, inlet valve and piping).

The southern portion of the site (a right of carriageway and easement for services) was not part of the current contamination assessment.

The general soil profile within the site comprised imported fill material overlying natural silty clay.

There were no obvious ash materials, fibro-cement pieces, odour or discolouration at the sampling locations.

Site conditions, historical information and field work suggested the following for potential contamination:

- Use of the site as car park.
- Presence of imported fill materials.

As part of the PCA, a sampling and testing plan was implemented to address potential contamination in the site. The test pit locations are shown on Drawing No 13704/1-AA1.

Soil samples were recovered and analysed for the identified contaminants of concern, being Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TPH, BTEX, PAH, OCP, PCB, Phenols and/or asbestos.

The findings of the PCA are summarised as follows:

- The site was vacant at the time of the inspection, however the site was temporarily fenced off for the field work otherwise the subject site is a public car par.
- We understand that the proposed development of the site includes the construction of a residential building with one to two levels of basement car park.
- The site is mainly underlain by fill materials overlying natural silty clay. No fibro-cement pieces were observed in any sampling points. The soil profile encountered did not reveal any other visual evidence of significant contamination, such as staining, odours or significant foreign matter.
- All the laboratory test results satisfied the criteria for stating that the analytes selected are either not present i.e. concentrations less than laboratory limits of reporting or present in the sampled soil at concentrations that do not pose a risk of hazard to human health or the environment under a "residential with minimal opportunities for soil access" form of development, with the exception elevated nickel, TPH and PAH concentrations and detection of friable asbestos, as indicated on Drawing No 13704/1-AA2. Elevated Benzo(a)Pyrene TEQ concentrations and friable asbestos presents a risk of harm to human health, whilst elevated nickel, Benzo(a)Pyrene (BaP) and F3 (TPH >C16-C34) concentrations might impact on terrestrial ecosystems..

Based on this PCA, it is our opinion that the site can be made suitable for the proposed residential development with basement parking subject to implementation of the following recommendations:

- Detailed sampling and testing in the vicinity of locations of concern to delineate the extent contaminated soil. As well as determination of the coal tar status of bitumen identified within the site.
- Section 149(5) information for the site must be obtained as it may contain additional information regarding contamination issues. Any contamination issues will need to be addressed accordingly.
- Sampling and testing of soil in the southern portion of the site (a right of carriageway and easement for services), as this was outside of the current assessment.
- Development of a remedial action plan (RAP) to remediate the nickel, TPH, PAH and asbestos contaminated soil, plus any other contamination that might be identified through the recommended additional sampling and testing, followed by appropriate validation.

7.0 DETAILED SAMPLING & ANALYSIS PLAN AND SAMPLING METHODOLOGY

As part of the DCA, additional 7 systematic sampling (TP8 to TP14) was carried out in the site to meet Western Australia Guidelines due to asbestos contamination issue and also to delineate the extent of other chemical contamination issue.

Moreover, additional sampling TP1a, TP2a, TP3a and TP5a was carried out for waste classification purposes in the immediate vicinity of PAH contaminated locations TP1, TP2, TP3 and TP5, identified during PCA.

The test pit locations are shown on Drawing No 13704/2-AA1.

The sampling procedures adopted for test pits were as follows:

- The test pit location was excavated by using a backhoe, over the depth interval nominated by the Field Engineer. The representative soil sample was recovered directly from the bulk bucket of the backhoe using a stainless steel trowel. The stainless steel trowel was decontaminated prior to use in order to prevent cross contamination (refer to Section 10.2 for details of the procedures for decontamination of the trowel).
- To minimise the potential loss of volatiles, the laboratory soil sample for TPH testing was immediately transferred to a labelled, laboratory supplied, 250ml glass jar and sealed with an airtight, Teflon screw top lid. The fully filled jar was then placed in a chilled container.
- The recovered soil sample for asbestos analysis was transferred into a small plastic bag, which was placed inside a large plastic bag.

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

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

At completion of field sampling, the chilled container and large plastic bag were transported to our Penrith office and chilled container was transferred to a refrigerator where the temperature was maintained below 4°C.

The chilled containers and large plastic bag forwarded to the primary laboratory SGS Environmental Services (SGS) and the secondary laboratory Envirolab Services Pty Ltd (Envirolab), both NATA accredited. The COC were then forwarded to SGS and Envirolab.

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

No asbestos-cement pieces were noted in the test pits. The following laboratory analysis plan was implemented as a part of DCA:

- All recovered fill samples from the detailed systematic test pits were analysed for Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), Total Petroleum Hydrocarbons (TPH), BTEX (Benzene, Toluene, Ethyl Benzene and Xylenes), Polycyclic Aromatic Hydrocarbons (PAH) and asbestos.
- Three selected bitumen samples were analysed for coal tar analysis for screening purposes.

A summary of the laboratory test results is presented in Section 11.0 of this report.

8.0 FIELD QUALITY ASSURANCE & QUALITY CONTROL (QA & QC)

In order to ensure the integrity and reliability of the chemical analysis carried out, the following QA/QC procedures were implemented for the sampling and analytical program.

Rinsate Sample

A rinsate water sample (Rinsate RD1) was recovered on completion of field work in order to identify possible cross contamination between sampling locations.

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

As indicated in Table A, all concentrations in the rinsate blank sample were less than laboratory limits of reporting (LOR), which indicates that adequate decontamination was carried out in the field.

Trip Spike Sample

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

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

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

Trip spike sample (TSD1) was forwarded to the primary analytical laboratory with the samples collected from the site and was tested for BTEX. The test results for the trip spike sample, reported as a percentage recovery of the applied and known spike concentrations, are shown in Table B. The laboratory test results certificates are included in Appendix C.

As indicated in Table B, the results show a good recovery of the spike concentrations (ranging from 92% to 100%). Furthermore, all BTEX results were less than laboratory detection limits and there were no visible or olfactory indications of hydrocarbon contamination.

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

Duplicate Sample

In order to ensure reliable analytical results from the laboratory, one duplicate soil sample was prepared and submitted blind to the laboratory for analysis. The test results for the duplicate sample were compared with the test results of the corresponding original sample and are summarised in Table C. The laboratory test results certificates are included in Appendix C.

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% are generally considered acceptable. However, this variation can be higher for organic analysis than for inorganics and for low concentrations of analytes.

As shown in Table C, the comparison between the duplicate and corresponding original sample indicated generally acceptable RPD, with the exception of the RPD of few Metals and PAH mainly due to non-homogeneity of the samples. Therefore, the variations are not considered to be critical, and the test results provided by SGS are of adequate accuracy and reliability for this assessment.

Split Sample

The split sample provides a check on the analytical performance of the primary laboratory. One split sample was submitted for analysis to the secondary laboratory (Envirolab).

Based on Schedule B(3) of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM) the difference in the results between the split samples should in general be within 30% of the mean concentration determined by both laboratories, i.e., RPD should be within 30%. However, this variation can be higher for organic analysis than for inorganics and for low concentrations of analytes. The test results are summarised in Table D. The laboratory test results certificates are included in Appendix C.

As shown in Table D, the comparisons between the split and corresponding original sample indicated generally acceptable RPD, with the exception of the RPD of one Metal and one TPH, which were in excess of 30% mainly due to heterogeneity of the samples. Therefore, the variations are not considered to be critical and the test results provided by the primary laboratory are deemed reliable for this assessment.

9.0 LABORATORY QA & QC

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

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

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

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

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

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

The methods used by SGS and Envirolab have been validated as recommended in the NEPM and Australian and New Zealand Environment Conservation Council (ANZECC) guidelines and endorsed by NATA.

The samples analysed for TPH (C_6–C_9) and/or BTEX was extracted by the purge and trap method recommended by the NSW EPA.

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

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

10.0 ASSESSMENT CRITERIA

Investigation levels and screening levels developed in the Amendment NEPM 2013 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 and applicable to the top 3m of soil for residential use.

  The site is proposed for multi-story residential development. Therefore, with regard to human health, analytical results were assessed against risk based HIL for *residential with minimal opportunities for soil access* (HIL B).

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

  For this assessment the analytical results were assessed against the available HSL for *high density residential* (HSL B) for sand from depth of 0m to <1m and clay from depth of 0m to <1m.

- 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 results were assessed against the available ESL for *urban residential* for coarse-grained soil (sand) and fine-grained soil (clay).

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

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

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

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

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

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

The adopted assessment criteria for the soil samples are detailed in Tables E1, E2 and F to H.

11.0 FIELD & LABORATORY TEST RESULTS, ASSESSMENT & DISCUSSION

11.1 Field Results

Details of the sub-surface conditions encountered during field work for this DCA are presented in Table 1 in Appendix A of this report. As discussed in Section 4.0, the general soil profile within the site comprised imported fill material overlying natural silty clay at all test pit.

No fibro-cement pieces were observed in any sampling points. The soil profile encountered did not reveal any other visual evidence of significant contamination, such as staining, odours or significant foreign matter. No petroleum hydrocarbon odour was detected in the soil samples or the test pits.

11.2 Analytical Results

Reference may be made to Appendix C for the actual laboratory test results certificates from SGS and Envirolab. The test results are also presented in Tables E1, E2 and F to I together with the assessment criteria adopted. A discussion of the test data is presented in the following sub-sections.

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

The Metals test results for all discrete fill samples are presented in Tables E1 and E2, and as shown, all concentrations of Metals were below the available Ecological Investigation Level (EIL) and Health Investigation Levels (HIL) for residential use with minimal opportunities for soil access (HIL B), with the exception of highlighted zinc (Zn) concentration in Table E2.

The highlighted Zn concentration exceeded the relevant EIL, but was below the relevant HIL B.

The Zn concentration (580mg/kg) might impact on terrestrial ecosystems but would not present a risk of harm to human health.

All concentrations of cadmium (Cd) and mercury (Hg) were also below the relevant provisional phytotoxicity based investigation levels (PIL).

11.2.2 Total Petroleum Hydrocarbons (TPH) and BTEX

The TPH and BTEX test results for all discrete fill samples are presented in Table F and as indicated, the concentrations of F1 (TPH C6-C10 less BTEX), F2 (TPH >C10-C16 less Naphthalene), F3 (TPH >C16-C34), F4 (TPH >C34-C40) and BTEX were below the relevant HSL B and/or ESL adopted, with the exception of highlighted F3 concentrations.

The F3 concentrations (700mg/kg and 750mg/kg) exceeded the relevant ESL and present a risk to terrestrial ecosystems.

11.2.3 Polycyclic Aromatic Hydrocarbons (PAH)

The PAH test results for all discrete fill samples are presented in Table G and as shown, concentrations of Benzo(a)pyrene, Benzo(a)pyrene TEQ, Naphthalene and Total PAH were well below the relevant HIL B, ESL, HSL B and EIL adopted, with the exception of highlighted Benzo(a)pyrene (BaP) concentrations.

The Benzo(a)pyrene concentrations (ranging from 0.9mg/kg to 2.3mg/kg) might impact on terrestrial ecosystems.

11.2.4 Asbestos

The asbestos test results for all discrete fill samples are presented in Table H. As shown in the table, friable Chrysotile and Crocidolite Asbestos was found in fill sample TP9 (0-0.15m). Bonded Chrysotile Asbestos was found in the fill sample TP8 (0-0.15m). No asbestos was found in other soil samples analysed.

Friable asbestos presents a risk of harm to human health and bonded asbestos containing materials potentially presents a risk of harm to human health.

11.2.5 Coal Tar

As indicated in Table I, coal tar was absent in the bitumen samples analysed.

12.0 SITE CHARACTERISATION

Based on the PCA and DCA, the identified revised locations of concern are indicated and tabulated on Drawing No 13704/2-AA2 and summarised below:

- Locations where Benzo(a)pyrene TEQ concentrations present a risk of harm to human health.
- Locations where F3 (TPH >C16-C34), Benzo(a)pyrene, nickel and zinc concentrations might impact on terrestrial ecosystems.
- Locations where friable asbestos in the fill profile present a risk of harm to human health.
- Location where bonded asbestos containing material (ACM) fragments in the fill profile potentially present a risk of harm to human health.

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

Migration of soil contaminants to the deeper soils or groundwater regime would generally be via leaching of contaminants from the surface soil, facilitated by infiltration of surface water. The natural silty clay beneath the site is relatively impermeable. As such, leaching of any contaminants into the groundwater regime is unlikely.

Based on observation and site topography, surface run-off would predominantly flow to the west towards the multi- story car park. Obvious local depressions that might capture or divert stormwater run-off which was were not observed within the site.

13.0 SITE REMEDIATION

Based on the PCA and DCA, two locations within the site contain elevated Benzo(a)pyrene TEQ concentrations, eight locations contain elevated Benzo(a)pyrene concentrations and five locations contain elevated F3 (TPH >C16-C34) concentrations, one location contains elevated nickel concentration and on location contains elevated zinc concentration. Moreover, friable asbestos contaminated fill materials were found at two locations whilst bonded ACM fragments were found within another fill profile.

Benzo(a)pyrene TEQ contamination and friable asbestos contamination present a risk of harm to human health. ACM fragments in the fill profile potentially present a risk of harm to human health. Elevated Benzo(a)pyrene, F3 (TPH >C16-C34), nickel and zinc concentrations might impact on terrestrial ecosystems. Therefore, remediation is required.

13.1 Site Remediation Policy

Under the Protection of the Environment Operations Act 1997 (POEO Act) and in accordance with the NSW Department of Environment and Conservation (DEC) (2006), Guidelines for the NSW Site Auditor Scheme (2nd edition), the preferred options for remediation and/or management of contaminated land are summarised as follows, in order of preference:

1. Avoiding contamination of a site.
2. On-site treatment of the soils so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, then re-use of the soils on-site.
3. Off-site treatment of excavated soils so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site for re-use.
4. Removal of contaminated soils to an approved site or facility followed by replacement with clean fill.
5. Consolidation and isolation of the soil on-site by containing within a properly designed barrier.

The criteria for disposal of contaminated waste is generally governed by the "Waste Classification Guidelines Part 1: Classifying Waste" *EPA* 2014. 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 category 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.

The criteria for re-use of soils removed from a site are currently governed by the following:

- Guidelines on Resource Recovery Exemptions (Land Application of Waste Materials as Fill), DECC, NSW (February 2011).
- POEO (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A – The Excavated Natural Material Order and Exemption 2014.

13.2 Remediation Areas

Based on the contaminant concentrations and locations identified from the contamination assessments, one indicative remediation area (Area 1) has been developed and is shown on Drawing No 13704/2-AA3. Included on the plan is a table indicating the estimated area and depth of contaminated soils, types of soils and contaminants concerns.

13.3 Remediation Goal

The goal of remediation is to enable a statement to be made declaring the site environmentally suitable for the proposed residential development.

13.4 Remedial Options

In general, the requirement for remediation of the site was governed by the presence of PAH and asbestos contaminated fill materials with elevated TPH and Metals concentrations.

As such, disposal of PAH and asbestos contaminated fill materials elevated TPH and Metals concentrations at a NSW EPA licensed landfill facility is considered to be the most appropriate remediation options for the site.

13.4.1 Off-site Landfill Disposal

Area 1 contains PAH and asbestos contaminated fill materials elevated TPH and Metals concentrations. A contractor with a Class A Licence for friable asbestos must supervise removal and loading of the asbestos contaminated fill from Area 1 in a covered, leak-proof vehicle for transport to a NSW EPA licensed landfill facility.

Proper asbestos air monitoring will also be required during excavation of asbestos contaminated fill from Area 1.

13.5 Soil Classification

About 50mm thick bitumen was observed on the ground surface of the most of Area 1. Laboratory test results indicate absent of coal tar in the bitumen layer. Hence, according to the "Waste Classification Guidelines Part 1: Classifying Waste", the NSW EPA 2014, the bitumen layer is pre-classified as General Solid Waste. According to the above-mentioned guidelines, the fill materials in Area 1 are classified as "Specific Waste - Asbestos Waste"" based on the asbestos test results, total concentrations of analytes within the fill materials and/or the result of TCLP testing. Reference may be made to Tables DD1 to DD7 in Appendix D for classification details for fill materials in Area 1.

The remaining fill material within the investigated area of the site is classified as "General Solid Waste" based on the asbestos test results, total concentrations of analytes and/or the result of TCLP testing. Reference may be made to Tables EE1 and EE7 in Appendix E for classification details for remaining fill materials.

13.6 Preparation for Remedial Works

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

- Notify Penrith City Council. SEPP No 55 sets out the definitions of Category 1 and Category 2 remediation works. Development consent is required for Category 1 remediation works; whereas Category 2 remediation works do not require consent. The council must be notified of all remedial works (30 days notification) **whether or not** development consent for the remediation is required. It is understood that the Council has already been notified.
- Notification must be provided by the remediation contractor to WorkCover NSW to excavate and dispose of asbestos contaminated fill at an EPA licensed landfill facility, specifically by the Class A licensed contractor for friable asbestos.
- All intended environmental management measures (refer to Section 14.0) will be installed by the appointed remediation contractor. An appointed environmental consultant will inspect all measures prior to remedial works commencing.
- All workers involved in the remediation works will be inducted into the Occupational Health & Safety (OH&S) requirements and in particular, the personal protective equipment required (refer to Appendix F).
- The nominated licensed landfill will be contacted and informed of the soil classification details in order to obtain an approval for acceptance of the contaminated soils. All documentation required by the landfill facility will be completed as required.

14.0 ENVIRONMENTAL MANAGEMENT PLAN

The appointed remediation contractor will be provided with a copy of this RAP, so that they are aware of the contamination status of the soils 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:

- POEO Act
- Construction Safety Act
- OH&S Act

All site works will comply with the provisions set out in the following:

- WorkCover NSW: Working with Asbestos Guide – 2008
- New South Wales Work Health and Safety Regulation 2011
- NSW EPA: Waste Classification Guidelines Part 1: Classifying Waste – November 2014
- NSW DEC Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition) – 2006
- Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land – Department of Urban Affairs and Planning / NSW 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.
- Water containing suspended matter or contaminants will not leave the confines of the site, as this might 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.
- Noise levels at the site boundaries will comply with the noise quality objectives of the region or legislative requirements.

The appointed Environmental Consultant will ensure that the contractor and the contractor's employees are familiar with the contents of the Environmental Management Plan.

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 and the previously mentioned items.

14.1 Working Hours

All remediation works will be carried out between the hours specified or required by Penrith City Council.

14.2 Security / Safety Measures

Prior to any remediation works being carried out, temporary fence need to be erected to ensure no public access during the remediation works. The front gate will be closed and padlocked at completion of each day. Adequate signage containing a "no unauthorised entry" statement, as well as the contractor's name and contact details 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 in attendance 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 reversing signals.

All remediation works will be completed and validated prior to any construction works proceeding within the site.

14.3 Traffic Management / Truck Monitoring

Access into the site will be from Woodriff Street. Prior to exiting, the site trucks will pass over a shaker grid or truck wash bay.

At 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 exiting trucks, which will be cleaned up and returned to the site. If excess or regular deposits occur, 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. Each load of contaminated soil leaving the site shall be such that the origin, dispatch time, cleanliness of the vehicle, route, destination and arrival time are recorded. Appropriate (trip ticket) docket information confirming disposal shall be maintained for inspection.

14.4 Dust Control

Generation of dust will be kept to a minimum at all times.

During working hours whilst working within asbestos contaminated areas, 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 any asbestos contaminated soil stockpile to minimise 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, with regard to dust. The complaints register will be completed by the Site Superintendent, as well as the corrective actions implemented.

14.5 Sediment and Stormwater Containment

Industry standard sediment control measures will be installed where there is a potential for sediment to spill onto neighbouring properties, public roads or the detention basin.

A silt fence or straw bales must be placed around any soils temporarily stockpiled on site in order to prevent the loss of soils during rain periods.

The sediment control measures will be regularly inspected and maintained by the site foreman. The Environmental Consultant will also carry out regular inspections.

14.6 Run-off

Run-off water, including that due to rain that has not been in contact with any contaminated soil is not of concern. Contaminated soil may be exposed at the surface and any surface water that comes into contact with soil must be collected. If the contaminated soil needs to be stockpiled on site temporarily, excavated material will be placed on the up-gradient side of the excavation and will be covered with tarpaulins. This method ensures that minimal rainwater will come into contact with contaminated soil and where it does, run-off water will be contained within the excavation.

Water suspected to be contaminated will be sampled and analysed by the laboratory to determine the most appropriate manner of disposal in accordance with the relevant guidelines.

It should be noted that excavation into contaminated soil is best commenced if fine, dry weather is forecast for the next 48 hour working period.

14.7 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 minimise noise impacts during the remediation works, the following measures will be implemented:

- Construction noise will be confined to the hours stipulated by Council. 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.

14.8 Odour Control

In order to control odours at the site boundaries, the following processes will be adopted:

- All plant and equipment exhaust levels will be monitored by the site foreman / superintendent to ensure acceptable levels. If unacceptable levels are determined, the equipment will be replaced or repaired.
- If strong hydrocarbon odours are detected from any of the machinery, a hydrocarbon mitigating agent will be used.

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

14.9 Waste and Asbestos Management

Disposal of contaminated soils (waste) from Area 1 generated by the remediation works will be in accordance with Section 13.0 of this RAP.

All contaminated soil must be transported in a covered, leak-proof vehicle, and disposed of in accordance with NSW EPA and/or WorkCover NSW requirements.

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.

All the transport records (truck registration number, driver, date and time leaving the site), photographs, and delivery dockets must be obtained and kept by the remediation contractor for recording purposes.

Procedures for waste and asbestos management will include but not be limited to:

- Documenting the results of the visual and sample assessment, and the safe system of management throughout the remediation works.
- Notifying WorkCover NSW for removal of asbestos contaminated soil. This is generally done by the Class A Licensed contractor.
- Dampening, not saturating, the excavated fill materials, earth mound and work area with water spray to minimise the potential for asbestos fibres from the asbestos contaminated soil becoming airborne.
- Wearing appropriate personal protection equipment (PPE) as detailed in the OH&S Plan in Appendix F.
- NATA accredited asbestos air monitoring in the vicinity of the exclusion zone (a minimum of 10m from the perimeter of the asbestos contaminated area) for airborne asbestos during excavation and loading of asbestos contaminated soil from Area 1. If monitoring indicates the presence of airborne asbestos, all works must cease immediately and the remediation methods re-assessed.
- Supervision of excavation and loading of friable asbestos contaminated soil from Area 1 by a contractor with Class A Licence for friable asbestos.
- Appropriate documentation of trucks that are used to transport contaminated soil before leaving the site and after disposing of the contaminated soil at an EPA licensed landfill facility.

Information relating to asbestos contamination in soils and safe disposal and transport is presented in WorkCover NSW (2008) Working with asbestos and NOHSC (2005) Code of Practice for the management and control of asbestos in the work place.

15.0 OCCUPATIONAL HEALTH & SAFETY

A site-specific OH&S Plan has been developed to ensure that remediation works are conducted in a safe manner. Personnel working on the site are required to read and understand the OH&S Plan. The full OH&S Plan is included in Appendix F of this report.

16.0 SITE VALIDATION

Validation sampling and testing forms 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 use. A qualified Environmental Representative of the Environmental Consultant will undertake all validation sampling.

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

1. All previously identified contaminated soil is appropriately remediated.
2. Any soil with aesthetic issues such as unacceptable odour or discolouration is removed from the site.
3. All waste disposal is carried out in accordance with current legislation.
4. The risks that the retained soils pose to human health or the environment are minimal and acceptable.
5. The site is suitable for the proposed residential development.

The data qualitative objectives (DQO) for the validation process will be developed in accordance with Appendix IV of the DEC (2006), Guidelines for the NSW Site Auditor Scheme (2nd edition). 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.

The following table provides a list of the DQI for the proposed validation and the methods adopted to ensure that the DQI are met:

DATA QUALITY INDICATOR	METHODS OF ACHIEVEMENT
Documentation Completeness	Preparation of COC records. Laboratory sample receipt information. NATA registered laboratory results certificates.
Data Completeness	Validation sampling density is sufficient to establish 95% Upper Confidence Limits. On site visual assessment of soils. On site assessment of odour. Analysis for contaminants of concern.

DATA QUALITY INDICATOR	METHODS OF ACHIEVEMENT
Data Comparability	Using appropriate techniques for sample recovery. Using appropriate sample storage and transportation methods. Use of a NATA registered laboratories.
Data Representativeness	Reasonable validation sampling coverage. Representative validation sampling. Representative coverage of contaminants.
Data Precision and Accuracy	Use of trained and qualified field staff. Appropriate industry standard sampling equipment and decontamination procedures. 1 in 20 intra-laboratory/duplicate sample, 1 in 20 inter-laboratory/split sample and 1 rinsate blank water daily. Acceptable RPD for duplicate and split sample comparison. Acceptable concentrations in rinsate blank water samples. Check of laboratory QC methods and results.

The remediation works carried out will be validated through the following processes:

- Monitoring and documentation of the works by an appointed Environmental Consultant.
- Collection and review of waste transportation and disposal documentation.
- Visual inspection, sampling and testing of soils upon removal of identified contaminated materials.

Following completion of removal of asbestos contaminated soil from Area 1, a WorkCover licensed asbestos assessor must be engaged to issue clearance of Area 1 for the proposed residential development.

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

Following the clearance of Area 1, an Environmental Consultant will carry out Validation sampling of Area 1 due to PAH, TPH and Metals contamination.

The following samples will be recovered using a stainless steel trowel, which will also satisfy the minimum sampling point requirement for each area, based on "Sampling Design Guidelines for Contaminated Sites" 1995, EPA:

- Excavation of side wall samples, 1 location per 10 linear metres or at least 1 per excavation wall, recovered from the top of the excavation to the full depth of the wall (at least one sample in every 500mm of soil or change of soil profile, with allowable maximum sampling thickness of 300mm).
- Excavation base samples, 1 location per 200m^2, recovered from the excavation base surface to a depth of 0.1m.

A thorough visual inspection of the excavation pit in Area 1 must also be carried out to confirm that no soil with unacceptable odour or discoloration remains in the pits and footprint.

Any identified residual contamination must be excavated and disposed off-site under the same classification and then the area should be re-sampled and tested.

The stainless steel trowel will be regularly decontaminated using Decon 90 and distilled water. Disposable gloves will be used to transfer validation samples into glass jar for TPH analysis. The glass jars will be stored in a chilled container.

Samples of the rinse water will be retained and forwarded to the testing laboratory for analysis in order to assess any cross-contamination issues.

Industry standard QA and QC samples will also be prepared, including rinsate samples (one rinsate per day of field work), field duplicates (about 5% of samples analysed) and inter-laboratory duplicates (about 5% of samples analysed). The test results for these samples will be used to assess data precision and accuracy.

The recovered samples will be forwarded to a NATA accredited laboratory for analysis of the contaminants identified at each remediation area. All recovered samples will be forwarded under COC.

The remediated areas should be validated as being clean of the previously identified contaminant. The adopted clean up Threshold Level is presented in the following table:

Analyte	HIL B (mg/kg)	EIL (mg/kg)	ESL (mg/kg)
Nickel	1200	40 [a]	-
Zinc	60000	540 [b]	-
F3 (TPH >C16-C34)	-	-	300
BaP TEQ	4	-	-
BaP	-	-	0.7

Notes: HIL B Health-based Investigation Level for 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 for urban residential land use
ESL Ecological Screening Level for urban residential land use
TPH Total Petroleum Hydrocarbons
BaP Benzo(a)Pyrene
a: EIL of nickel may vary depending on concentration of Cation Exchange Capacity of recovered validation
b: EIL of zinc may vary depending on concentration of Cation Exchange Capacity and pH of recovered validation

The NEPM provides guidance for assessment of a statistical distribution of contaminant concentrations taken from a data set of random samples. There are a number of criteria to be fulfilled in order to establish that a site (or study area) is not contaminated, which are:

- The arithmetic mean of the data set must be less than the relevant threshold level; that is, it is acceptable for individuals to exceed the guideline, but the cumulative mean of the data set of soil sample results should not exceed the threshold level.
- The standard deviation of the data set should be less than 50% of the relevant threshold level.
- No individual sample result should be greater than 250% of the relevant threshold level.

Where applicable, this statistical approach will be adopted for assessment of the laboratory data provided. However, as opposed to the arithmetic mean, the 95% Upper Confidence Limit (UCL) of the mean, as discussed in Section 5 of the NSW EPA "*Sampling Design Guidelines for Contaminated Sites*" – 1995, will be adopted as the governing value. Assessment of statistical distribution of test data sets where all concentrations were less than the laboratory LOR will not be carried out, as there is no data distribution to consider. In that situation, test result should not exceed the relevant threshold level.

Validation sampling will be carried out following completion of remediation works.

Any virgin excavated natural material (VENM) or excavated natural material (ENM) imported to the site will be validated as being suitable for use within the site prior to use. The validation process will be as follows:

- Review of any validation reports made available by the supplier of the materials by the appointed Environmental Consultant.
- If the validation reports provided are found to be adequate, inspection of incoming soils at the source site and during importation, to ensure the soils comply with those validated.
- If the validation report provided is found to be inadequate or if the incoming soils are suspect, appropriate sampling and testing will be carried out by the appointed Environmental Consultant prior to acceptance to the site.
- The imported VENM and/or ENM must meet the following requirements;
  a) Provide no unacceptable risk to human health and the environment.
  b) Free of contaminants.
  c) Suitable for the intended purposed and land use.
  d) Has been lawfully obtained.
- Only once approved by the appointed Environmental Consultant can VENM / ENM be imported for use as fill within the site.

17.0 CONTINGENCY PLAN

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

Incident / Event	Corrective Action
Validation test result does not meet the acceptable criteria	Excavate the identified residual contamination, followed by sampling and testing. This process must be continued until the test result meets the acceptable criteria.
Spillage/leakage of oil, hydraulic fluid, or other fuels from the excavator/backhoe and trucks	For major spill; place sandbags down slope, cover the area in sand, excavate impacted sand and soils and dispose of at an appropriate EPA approved facility. For minor spill; cover the area in sand, excavate impacted sand and soils and dispose at an EPA approved facility. Stop spillage/leakage where apparent.

Incident / Event	Corrective Action
Failure of sediment control measures	Replace or repair failed control measure. Determine 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. Wet all areas generating dust. Improve water control (i.e. sprays), where appropriate. Assess measures being implemented.
Unexpected findings (Suspect soils / asbestos pipes / underground tanks / other items detected during excavation works)	Cease works in that area and contact the appointed Environmental Consultant for assessment.
Excessive noise	Identify source and add or amend noise attenuation equipment or working hours.
Identification of contaminated soils that cannot be directly disposed of at a landfill facility (i.e. hazardous waste under the EPA waste disposal guidelines)	The Environmental Consultant will contact an appropriately licensed and qualified remediation contractor to manage the contaminated soils in accordance with their license. Some form of pre-treatment then disposal is likely to be required.
Identification of significant amounts of contaminated soil which can be very /expensive to dispose of at a landfill facility	The containment or capping of contaminated soil on-site can be considered. Technical issues associated with physically capping and containing contaminants on-site must be proven effective. An ongoing environmental management plan (EMP) would be required to be prepared by the appointed Environmental Consultant to the satisfaction of the council. The EMP would need to be legally enforceable. Where containment and/or capping of contaminants are undertaken, either the land owner will place a covenant on the land title, or the requirements for the ongoing EMP to be legally enforceable would be as a condition of consent. For the latter option, the council must agree in writing to having a conditional sign-off and be satisfied of the legality of the EMP.

18.0 CONCLUSION AND RECOMMENDATIONS

The site was used as a commercial land in the past. Currently the site is used as a public car park.

The site is underlain by imported fill overlying natural silty clay.

Based on the PCA and DCA, one indicative remediation area (Area 1) has been developed as shown on Drawing No 13704/2-AA3, removal of contaminated soils from indicative Area 1 will be required.

Following completion of removal of contaminated soils from Area 1, a WorkCover licensed asbestos assessor must be engaged to issue clearance report for Area 1 by undertaking appropriate inspection, sampling and testing.

Following the clearance of Area 1, an Environmental Consultant must be engaged to carry out Validation sampling and testing to ensure complete removal of PAH, TPH and Metals contamination. A thorough visual inspection of the excavation pit in Area 1 must also be carried out to confirm that no soil with unacceptable odour or discoloration remains in the pit.

After disposal of the contaminated soils, the disposal dockets must be forwarded to the appointed Environmental Consultant for reporting purposes.

A validation report will be produced at completion of successful remediation. The format of the report will follow that recommended in the NSW EPA, "Guidelines for Consultants Reporting on Contaminated Sites" – 2011.

Following completion of remediation works, if excess fill materials in the site requiring removal from the site, could be removed under General Solid Waste classification and must be transported and disposed of at an EPA licensed landfill facility. Removal and disposal of the waste must be carried out in accordance with the requirements of the regulators, such as NSW WorkCover and NSW EPA.

For any natural soil beneath the fill materials to be excavated and removed from the site, it is recommended that classification of natural soil in accordance with the NSW EPA guidelines for the resource recovery exemptions under the Protection of the Environment Operations (Waste) Regulation 2005 is undertaken, following completion of removal of all fill materials from the site, for potential re-use at other development sites.

19.0 REPORT / ASSESSMENT LIMITATIONS

The services performed by Geotechnique were conducted in a manner consistent with the level of quality and skill generally exercised by members of the profession and consulting practice.

This report has been prepared for Astina Group for the purposes stated within. Penrith City Council may rely upon the report for development and/or construction application determinations. Any reliance on this report by other parties shall be at such parties' sole risk as the report might not contain sufficient information for other purposes.

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

The information in this report is considered accurate at completion of field sampling for this assessment (15 June 2016) in accordance with current site conditions. Any variations to the site form or use beyond the sampling date could nullify the conclusions stated.

Whilst investigations conducted at the site were carried out in accordance with current NSW guidelines, the potential always exists for 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.

GEOTECHNIQUE PTY LTD

LIST OF REFERENCES

Contaminated Land Management Act 1997

Contaminated Land Management Regulation 1998

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

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

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

Geology of Penrith 1:100,000 Sheet (9030) – Geological Survey of New South Wales, Department of Minerals and Energy 1991

Guidelines on Resource Recovery Exemptions (Land Application of Waster Materials as Fill), DECC, NSW (February 2011)

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

National Environmental Protection (Assessment of Site Contamination) Amendment Measures 1999, National Environmental Protection Council 2013

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

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

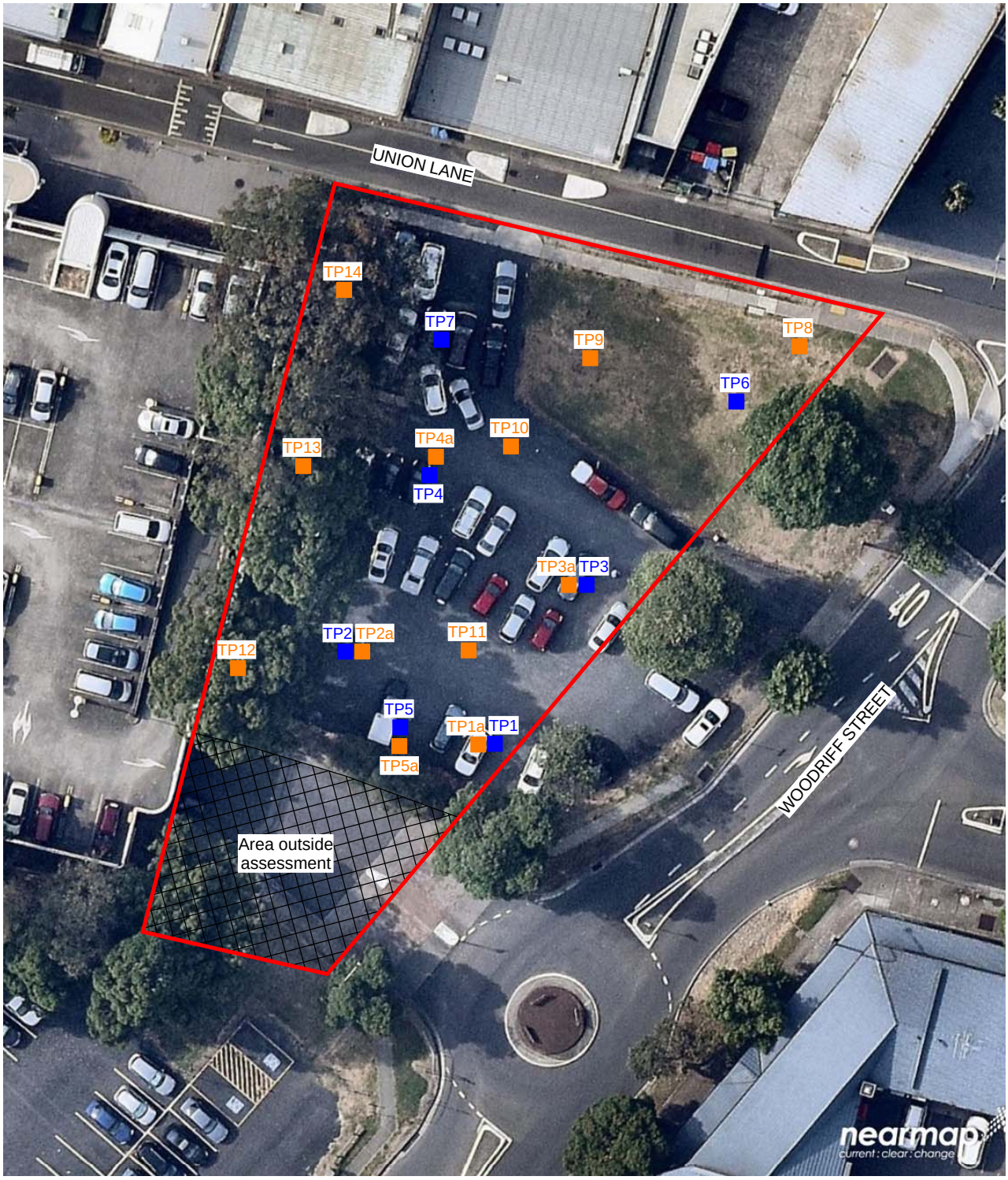
Soil Landscape of Penrith 1:100,000 Sheet (9030) – Soil Conservation Service Survey of NSW 1989

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

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

DRAWINGS

Drawing No 13704/2-AA1	*Test Pit Locations*
Drawing No 13704/1-AA1	*Site Features & Test Pit Locations*
Drawing No 13704/1-AA2	*Locations of Concern*
Drawing No 13704/2-AA2	*Revised Locations of Concern*
Drawing No 13704/2-AA3	*Indicative Areas to be Remediated*



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LEGEND

- Test Pit (Preliminary Contamination Assessment)
- Test Pit (Detailed Contamination Assessment)

0 5 10 15 20 25m

Scale 1:500

PREPARED BY:

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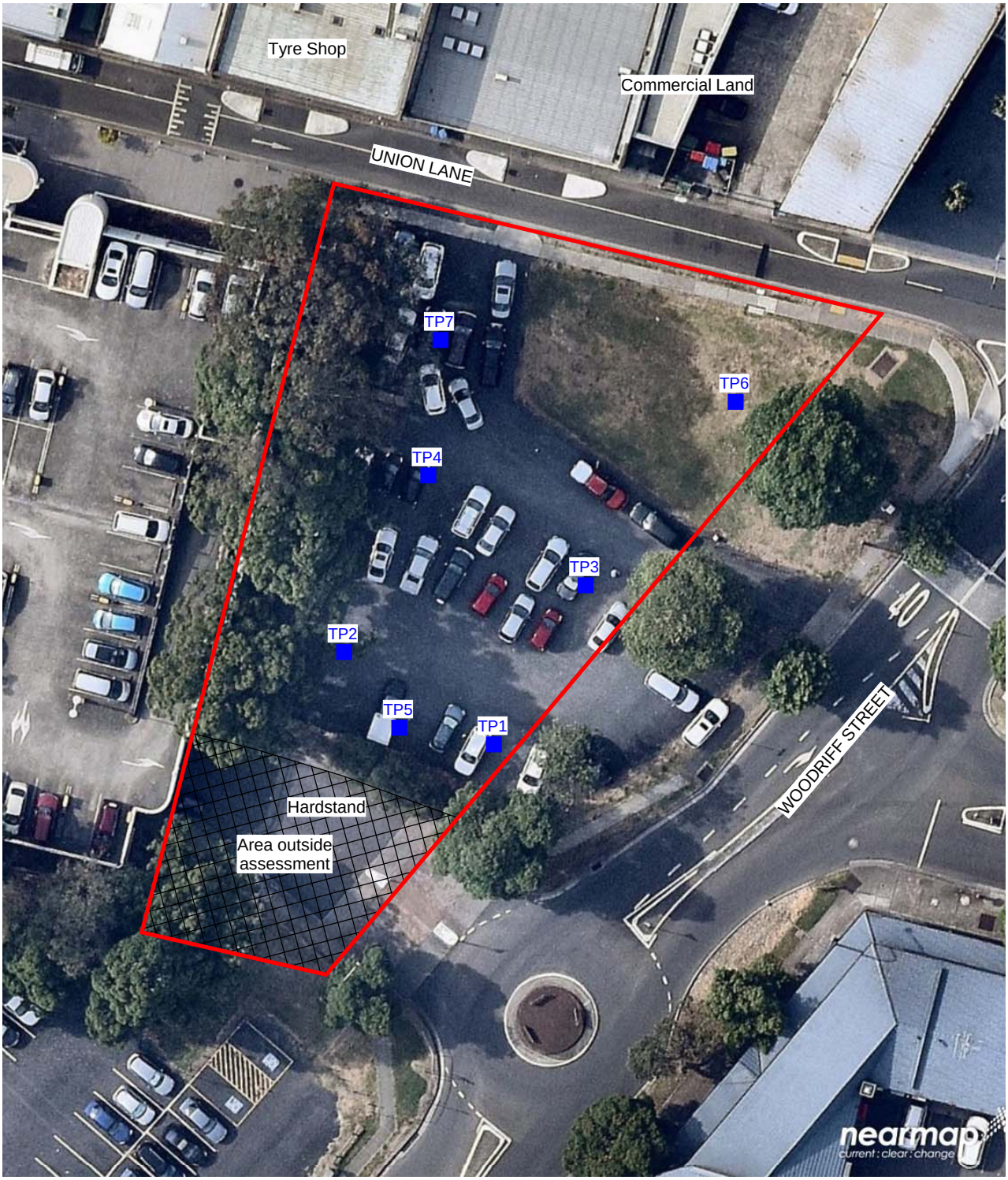
Lot 101 in DP1031340
21-25 Woodriff Street
Penrith

Test Pit Locations

Drawing No: 13704/2-AA1
Job No: 13704/2
Drawn By: MH
Date: 16 June 2016
Checked By: AB

File No: 13704-2
Layers: 0, AA1



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LEGEND

Test Pit

0 5 10 15 20 25m

Scale 1:500

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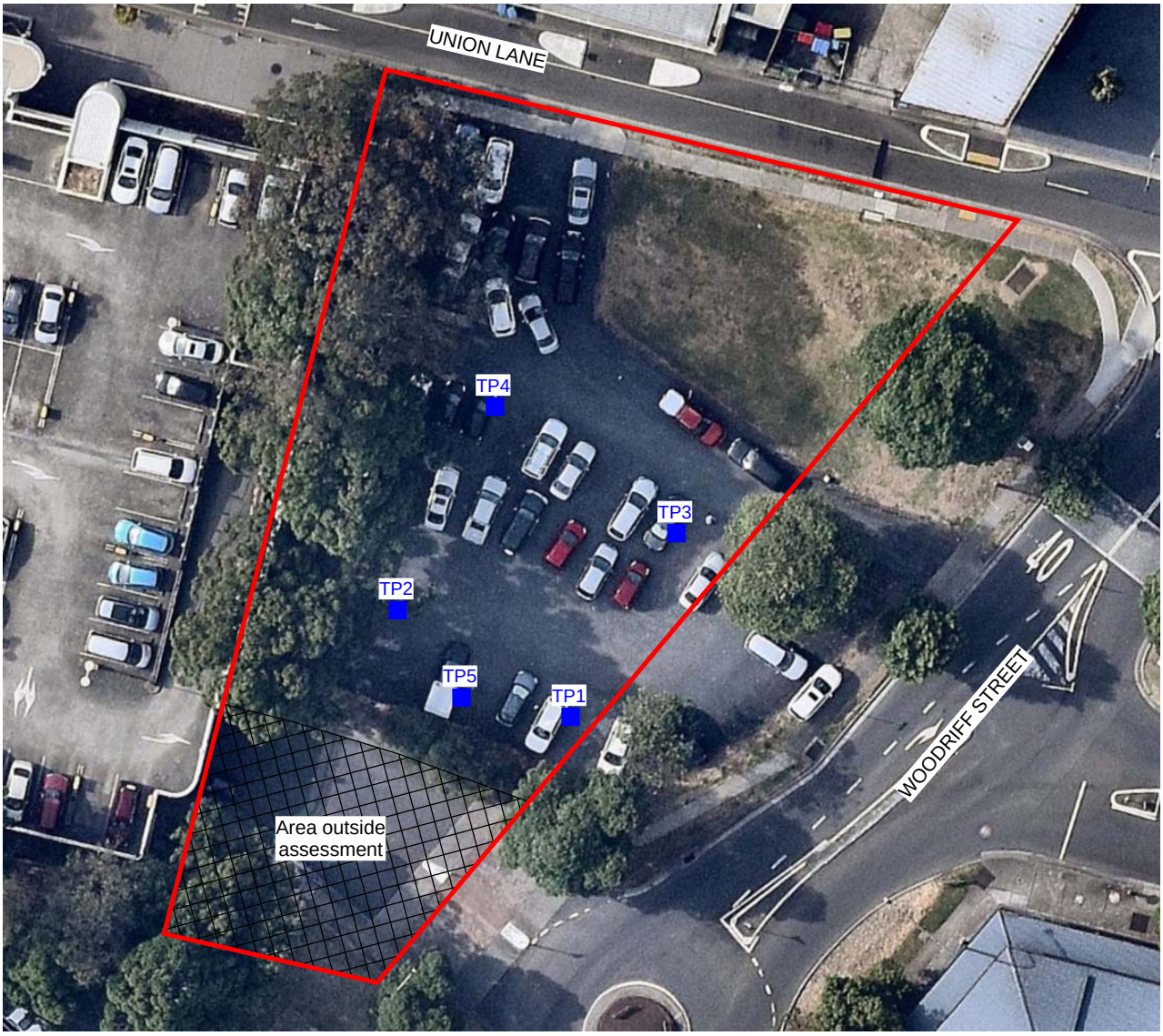
Site Features & Test Pit Locations

Drawing No: 13704/1-AA1
Job No: 13704/1
Drawn By: MH
Date: 10 May 2016
Checked By: JH/AB

File No: 13704-1
Layers: 0, AA1



LEGEND

Test Pit

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0 5 10 15 20 25m

Scale 1:500

Sample Location	Depth (m)	Contaminant	Concentration (mg/kg)	Assessment Criteria (mg/kg)
TP1	0-0.15	Benzo(a)pyrene (BaP)	**2.4**	BaP = 0.7 [a]
TP2	0-0.15	BaP	**2.2**	BaP = 0.7 [a]
	0.15-0.8	BaP	**1.4**	BaP = 0.7 [a]
Split S1 (TP2)	0-0.15	F3 [d]	**440**	F3 = 300 [a]
TP3	0-0.15	BaP	**4.7**	BaP = 0.7 [a]
		F3	**550**	F3 = 300 [a]
		BaP TEQ	**6.7**	BaP TEQ = 4 [b]
TP4	0-0.15	F3	**550**	F3 = 300 [a]
TP5	0-0.15	BaP	**3.7**	BaP = 0.7 [a]
		BaP TEQ	**5.7**	BaP TEQ = 4 [b]
		F3	**510**	F3 = 300 [a]
		Nickel (Ni)	**47**	Ni = 40 [c]
		Friable Asbestos	**-**	-

Notes: a:Ecological Screening Level (ESL) for urban residential land use

b: Health-based Investigation Level for residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments (HIL B)

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

d: TPH >C16 - C34

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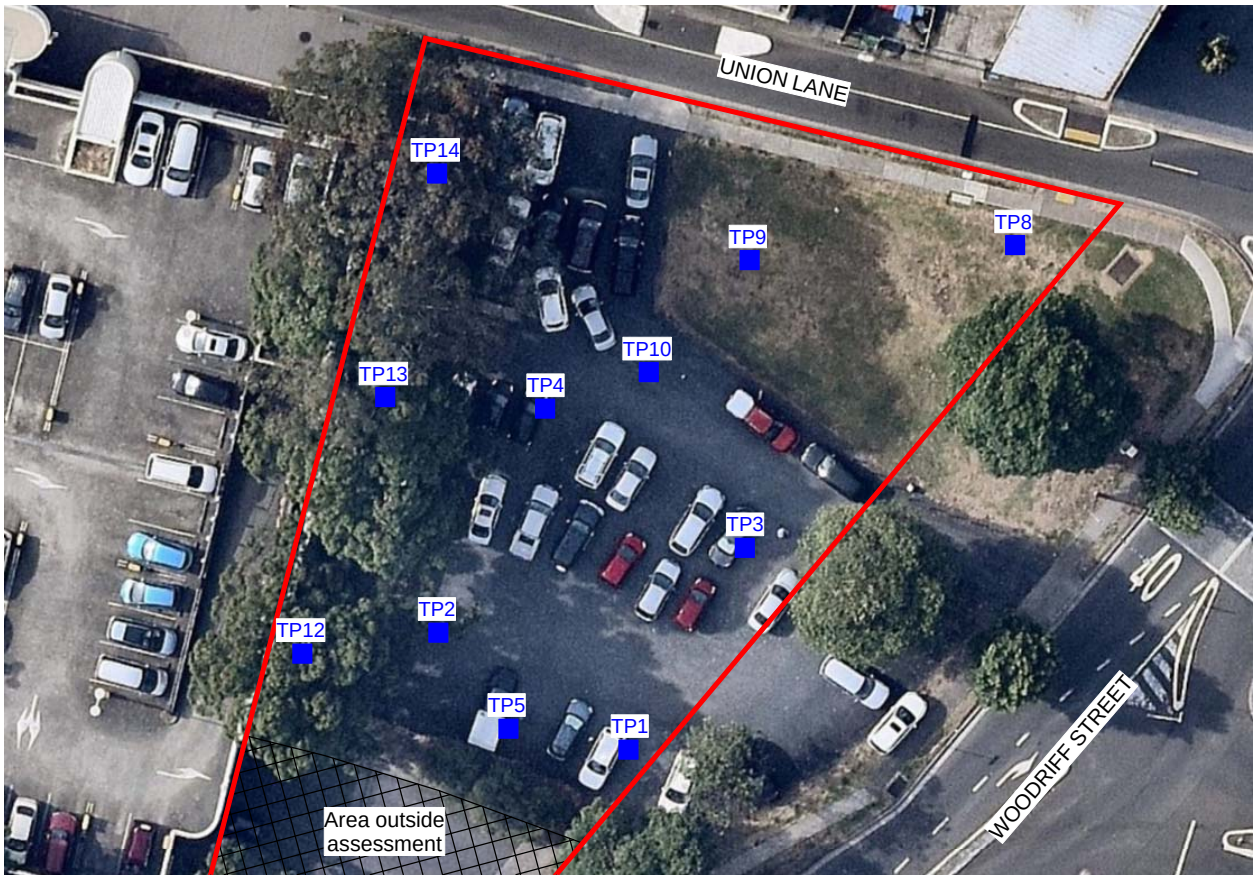
Penrith

Locations of Concern

Drawing No: 13704/1-AA2
Job No: 13704/1
Drawn By: MH
Date: 10 May 2016
Checked By: AB

File No: 13704-1
Layers: 0, AA2



LEGEND

Test Pit

Imagery ©2016 NearMap.com

0 5 10 15 20 25m

Scale 1:500

Sample Location	Depth (m)	Contaminant	Concentration (mg/kg)	Assessment Criteria (mg/kg)
TP1	0-0.15	Benzo(a)pyrene (BaP)	**2.4**	BaP = 0.7 [a]
TP2	0-0.15	BaP	**2.2**	BaP = 0.7 [a]
	0.15-0.8	BaP	**1.4**	BaP = 0.7 [a]
Split S1 (TP2)	0-0.15	F3 [d]	**440**	F3 = 300 [a]
TP3	0-0.15	BaP	**4.7**	BaP = 0.7 [a]
		F3	**550**	F3 = 300 [a]
		BaP TEQ	**6.7**	BaP TEQ = 4 [b]
TP4	0-0.15	F3	**550**	F3 = 300 [a]
TP5	0-0.15	BaP	**3.7**	BaP = 0.7 [a]
		BaP TEQ	**5.7**	BaP TEQ = 4 [b]
		F3	**510**	F3 = 300 [a]
		Nickel (Ni)	**47**	Ni = 40 [c]
		Friable Asbestos	**-**	-
TP8	0-0.3	Bonded Asbestos Containing Material (ACM)	**-**	-
TP9	0-0.4	Friable Asbestos	**-**	-
TP10	0.05-0.3	BaP	**1.2**	BaP = 0.7 [a]
TP10	0.3-0.8	BaP	**0.9**	BaP = 0.7 [a]
		Zinc (Zn)	**580**	Zn = 540 [c]
TP12	0.05-0.35	BaP	**1.6**	BaP = 0.7 [a]
TP13	0.05-0.2	BaP	**2.3**	BaP = 0.7 [a]
		F3	**750**	F3 = 300 [a]
TP14	0.05-0.2	BaP	**1.1**	BaP = 0.7 [a]
		F3	**700**	F3 = 300 [a]

Notes: a:Ecological Screening Level (ESL) for urban residential land use

b: Health-based Investigation Level for residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments (HIL B)

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

d: TPH >C16 - C34

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Revised Locations of Concern

Drawing No: 13704/2-AA2
Job No: 13704/2
Drawn By: MH
Date: 12 July 2016
Checked By: AB

File No: 13704-2
Layers: 0, AA2

LEGEND

Area to be Remediated

Imagery ©2016 NearMap.com

0 5 10 15 20 25m

Scale 1:500

AREA	MATERIAL	ESTIMATED AREA (sq. m)	ESTIMATED DEPTH (m)	CONCERN/ CONTAMINANT	REMEDIATION METHOD
1	Fill (Mixture of silty clay, low to medium plasticity, dark grey, gravel and/or bitumen, Silty clay, medium plasticity, pale brown, brown with inclusion of gravel)	1750	Ranging from 150mm to 800mm	Polycyclic Aromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons (TPH), Nickel, Zinc & Asbestos (Friable Asbestos & Bonded ACM fragments)	Disposal as "Asbestos Waste" at an EPA licensed Landfill

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Penrith

Indicative Area to be Remediated

Drawing No: 13704/2-AA3
Job No: 13704/2
Drawn By: MH
Date: 14 July 2016
Checked By: AB

File No: 13704-2
Layers: 0, AA3

TABLES

TABLE A
RINSATE SAMPLE
(Ref No: 13704/2-AA)

ANALYTES	Rinsate RD1
METALS	**(mg/L)**
Arsenic	<0.02
Cadmium	<0.001
Chromium	<0.005
Copper	<0.005
Lead	<0.02
Mercury	<0.0001
Nickel	<0.005
Zinc	<0.01
TOTAL PETROLEUM HYDROCARBONS (TPH)	**(µg/L)**
F1 (C6-C10 less BTEX)	<50
F2 (>C10-C16)	<60
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 HYDROCARBONS (PAH)	**(µg/L)**
Benzo(a)Pyrene TEQ	-
Total PAH	<1
Naphthalene	<0.1
Benzo(a)Pyrene	<0.1

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TABLE B
TRIP SPIKE SAMPLE
(Ref No: 13704/2-AA)

ANALYTES	Trip Spike TSD1
BTEX	
Benzene	99%
Toluene	92%
Ethyl Benzene	97%
Xylenes	100%

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

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TABLE C
DUPLICATE SAMPLE
(Ref No: 13704/2-AA)

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ANALYTES	TP13 0.05-0.2m mg/kg	Duplicate DD1 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	<3	<3	-
Cadmium	<0.3	0.3	-
Chromium	17	16	6.1
Copper	51	57	11
Lead	23	15	42
Mercury	0.03	0.01	100
Nickel	44	66	40
Zinc	62	54	14
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	29	<25	-
F3 (>C16-C34)	570	750	27
F4 (>C34-C40)	630	650	3.1
BTEX			
Benzene	<0.1	<0.1	-
Toluene	<0.1	<0.1	-
Ethyl Benzene	<0.1	<0.1	-
Xylenes	<0.3	<0.3	-
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	3.4	1.6	72
Total PAH	33	17	64
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	2.3	1.0	79

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TABLE D
SPLIT SAMPLE
(Ref No: 13704/2-AA)

ANALYTES	TP14 0.05-0.2m mg/kg (SGS)	Split Sample SD1 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	<3	<4	-
Cadmium	<0.3	<0.4	-
Chromium	13	16	21
Copper	46	69	40
Lead	12	12	0
Mercury	<0.01	<0.1	-
Nickel	39	47	19
Zinc	41	37	10
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	<25	<50	-
F3 (>C16-C34)	500	700	33
F4 (>C34-C40)	580	720	22
BTEX			
Benzene	<0.1	<0.2	-
Toluene	<0.1	<0.5	-
Ethyl Benzene	<0.1	<1	-
Xylenes	<0.3	<3	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene TEQ	1.5	1.7	13
Total PAH	13	11	17
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	0.9	1.1	20

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TABLE E1
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13704/2-AA)

Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
TP8	0-0.15	3	<0.3	12	13	44	0.08	6.7	54	9.5	7.4
TP9	0-0.15	<3	<0.3	11	21	26	0.02	10	43	-	-
TP11	0.2-0.5	6	<0.3	11	14	18	0.02	6.6	22	-	-
TP12	0.05-0.35	11	<0.3	14	23	68	0.08	11	200	11	7.7
TP12	0.55-0.85	13	0.3	9.7	43	72	0.1	7.7	110	-	-
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5	0.02	-
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL)[a] B - Residential B		500	150	500[c]	30000	1200	30[d]	1200	60000		
Ecological Investigation Levels (EIL)[b] - Urban residential		100[e]	-	190[f]	200	1100[g]	-	150	450		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				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: EIL of nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=9.5 cmolc/kg and pH=7.4 were selected for derivation of EIL.
EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
c: Chromium (VI)
d: Methyl Mercury
e: Generic EIL for aged arsenic
f: Chromium (III), clay content was assumed =1%, a conservative assumpt
g: Generic EIL for aged lead

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TABLE E2
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13704/2-AA)

Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
TP10	0.05-0.3	5	0.6	21	45	270	0.2	26	470	21	8.5
TP10	0.3-0.6	7	0.6	22	34	380	0.49	9.0	**580**	-	-
TP11	0.05-0.2	7	<0.3	10	27	160	0.07	12	180	33	8.7
TP13	0.05-0.2	<3	<0.3	17	51	23	0.03	44	62	-	-
Duplicate DD1 (TP13 0.05-0.2m)		<3	0.3	16	57	15	0.01	66	54	-	-
TP13	0.2-0.5	7	<0.3	8.8	17	39	0.11	7.3	290	12	8.1
TP14	0.05-0.2	<3	<0.3	13	46	12	<0.01	39	41	-	-
Split SD1 (TP14 0.05-0.2m)		<4	<0.4	16	69	12	<0.1	47	37	-	-
TP14	0.2-0.5	<3	<0.3	9.9	17	10	0.02	5.9	11	16	8.7
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5	0.02	-
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL)[a] B - Residential B		500	150	500[c]	30000	1200	30[d]	1200	60000		
Ecological Investigation Levels (EIL)[b] - Urban residential		100[e]	-	400[f]	210	1100[g]	-	190	540		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				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: #REF!

EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
c: Chromium (VI)
d: Methyl Mercury
e: Generic EIL for aged arsenic
f: Chromium (III), clay content was assumed =10%, a conservative assur
g: Generic EIL for aged lead

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TABLE F
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13704/2-AA)

											NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)																			
			TPH (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
TP8	0-0.15	clay	<25	<25	<25	<90	140	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP9	0-0.15	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP10	0.05-0.3	sand	<25	<25	<25	140	<120	<0.1	<0.1	<0.1	<0.3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
TP10	0.3-0.6	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	-	-	-	-	-	-	-	-
TP11	0.05-0.2	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
TP11	0.2-0.5	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP12	0.05-0.35	clay	<25	<25	<25	92	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP12	0.55-0.85	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP13	0.05-0.2	sand	<25	29	29	**570**	630	<0.1	<0.1	<0.1	<0.3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
Duplicate DD1 (TP13	0.05-0.2m)	sand	<25	<25	<25	**750**	650	<0.1	<0.1	<0.1	<0.3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
TP13	0.2-0.5	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP14	0.05-0.2	sand	<25	<25	<25	**500**	580	<0.1	<0.1	<0.1	<0.3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
Split SD1 (TP14	0.05-0.2m)	sand	<25	<50	<50	**700**	720	<0.2	<0.5	<1	<3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
TP14	0.2-0.5	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
Limits of Reporting (LOR)			25	-	25	90	120	0.1	0.1	0.1	0.3																						

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

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TABLE G
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TEST RESULTS
DISCRETE SAMPLES
(Ref No: 13704/2-AA)

							NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
			PAH (mg/kg)				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)
TP8	0-0.15	clay	<0.3	<0.8	<0.1	<0.1	4	400	5	170	0.7
TP9	0-0.15	clay	0.3	2.8	<0.1	0.2	4	400	5	170	0.7
TP10	0.05-0.3	sand	1.7	13	<0.1	**1.2**	4	400	3	170	0.7
TP10	0.3-0.6	clay	1.3	12	<0.1	**0.9**	4	400	5	170	0.7
TP11	0.05-0.2	sand	0.7	5.3	<0.1	0.5	4	400	3	170	0.7
TP11	0.2-0.5	clay	<0.3	<0.8	<0.1	<0.1	4	400	5	170	0.7
TP12	0.05-0.35	clay	2.3	19	<0.1	**1.6**	4	400	5	170	0.7
TP12	0.55-0.85	clay	0.6	4.6	<0.1	0.4	4	400	5	170	0.7
TP13	0.05-0.2	sand	3.4	33	<0.1	**2.3**	4	400	3	170	0.7
TP13	0.2-0.5	clay	0.3	2.5	<0.1	0.2	4	400	5	170	0.7
TP14	0.05-0.2	sand	1.5	13	<0.1	**0.9**	4	400	3	170	0.7
Split SD1 (TP14	0.05-0.2m)	sand	1.7	11	<0.1	**1.1**	4	400	3	170	0.7
TP14	0.2-0.5	clay	<0.3	<0.8	<0.1	<0.1	4	400	5	170	0.7
Limits 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.
NL: Not Limimting

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TABLE H

ASBESTOS TEST RESULTS

DISCRETE SAMPLES

(Ref No: 13704/2-AA)

Sample Location	Depth (m)	ASBESTOS
TP8	0-0.15	**Bonded Chrysotile Asbestos found (0.09% w/w)**; How ever no friable asbestos found at the limit of reporting of 0.001% w/w
TP9	0-0.15	**Friable Chrysotile and Crocidolite Asbestos Found (0.002% w/w)**
TP10	0.05-0.3	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP10	0.3-0.6	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP11	0.05-0.2	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP11	0.2-0.5	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP12	0.05-0.35	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP12	0.55-0.85	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP13	0.05-0.2	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP13	0.2-0.5	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP14	0.05-0.2	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP14	0.2-0.5	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w

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TABLE I

COAL TAR TEST RESULTS

DISCRETE SAMPLES

(Ref No: 13704/2-AA)

Sample Location	Depth (m)	COAL TAR
TP10	0-0.05	Absent
TP11	0-0.05	Absent
TP13	0-0.05	Absent

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APPENDIX A

TABLE 1
TEST PIT LOGS

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Development**	**Job No**	**13704/2**
Location	**Lot 101 in DP1031340**	**Refer to Drawing No**	**13704/2-AA1**
	21-25 Woodriff Street, Penrith	**Logged & Sampled by**	**JH**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP1a	0.0-0.15	0.0-0.15	15/06/2016		FILL: Mixture of Silty Clay, low to medium plasticity, dark grey, gravel and bitumen	
	0.15-0.7	0.5-0.7			FILL: Silty Clay, medium plasticity, pale brown	
	0.7-1.2	0.75-0.9			(CH) CLAY, high plasticity, pale brown	
TP2a	0.0-0.15	0.0-0.15	15/06/2016		FILL: Mixture of Silty Clay, low to medium plasticity, dark grey, gravel and bitumen	
	0.15-0.8	0.5-0.8			FILL: Silty Clay, medium plasticity, pale brown	
	0.8-1.3	0.85-1.0			(CH) CLAY, high plasticity, pale brown	
TP3a	0.0-0.15	0.0-0.15	15/06/2016		FILL: Mixture of Silty Clay, low to medium plasticity, dark grey, gravel and bitumen	
	0.15-0.8	0.5-0.8			FILL: Silty Clay, medium plasticity, pale brown	
	0.8-1.3	0.85-1.0			(CH) CLAY, high plasticity, pale brown	
TP4a	0.0-0.15	NS	15/06/2016		FILL: Mixture of Silty Clay, low to medium plasticity, dark grey, gravel and bitumen	
	0.15-0.7	NS			FILL: Silty Clay, medium plasticity, brown, inclusion of gravel	
	0.7-1.2	0.75-0.9			(CH) CLAY, high plasticity, pale brown	
TP5a	0.0-0.15	0.0-0.15	15/06/2016		FILL: Mixture of Silty Clay, low to medium plasticity, dark grey, gravel and bitumen	
	0.15-0.8	0.5-0.8			FILL: Silty Clay, medium plasticity, pale brown	
	0.8-1.3	0.85-1.0			(CH) CLAY, high plasticity, pale brown	
TP8	0.0-0.3	0.0-0.15	15/06/2016		FILL: Silty Clay, medium plasticity, pale brown	
	0.3-0.8	0.35-0.5			(CH) CLAY, high plasticity, pale brown	
TP9	0.0-0.4	0.0-0.15	15/06/2016		FILL: Silty Clay, medium plasticity, pale brown	
	0.4-0.9	0.45-0.6			(CH) CLAY, high plasticity, pale brown	

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

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Development**	**Job No**	**13704/2**
Location	**Lot 101 in DP1031340**	**Refer to Drawing No**	**13704/2-AA1**
	21-25 Woodriff Street, Penrith	**Logged & Sampled by**	**JH**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP10	0.0-0.05	0.0-0.05	15/06/2016		BITUMEN	
	0.05-0.3	0.05-0.3			FILL: Mixture of Silty Clay, low plasticity, dark grey, and gravel	
	0.3-0.8	0.3-0.6			FILL: Silty Clay, medium plasticity, brown, inclusion of gravel	
	0.8-1.3	0.85-1.0			(CH) CLAY, high plasticity, pale brown	
TP11	0.0-0.05	0.0-0.05	15/06/2016		BITUMEN	
	0.05-0.2	0.05-0.2			FILL: Mixture of Silty Clay, low plasticity, dark grey, and gravel	
	0.2-0.7	0.2-0.5			FILL: Silty Clay, medium plasticity, pale brown, inclusion of gravel	
	0.7-1.2	0.75-0.9			(CH) CLAY, high plasticity, pale brown	
TP12	0.0-0.05	NS	15/06/2016		BITUMEN	
	0.05-0.9	0.05-0.35 0.55-0.85			FILL: Silty Clay, medium plasticity, pale brown, inclusion of gravel	
	0.9-1.4	0.95-1.1			(CH) CLAY, high plasticity, pale brown	
TP13	0.0-0.05	0.0-0.05	15/06/2016		BITUMEN	
	0.05-0.2	0.05-0.2			FILL: Mixture of Silty Clay, low plasticity, dark grey, and gravel	
	0.2-0.7	0.2-0.5			FILL: Silty Clay, medium plasticity, brown, inclusion of gravel	
	0.7-1.2	0.75-0.9			(CH) CLAY, high plasticity, pale brown	
TP14	0.0-0.05	NS	15/06/2016		BITUMEN	
	0.05-0.2	0.05-0.2			FILL: Mixture of Silty Clay, low plasticity, dark grey, and gravel	
	0.2-0.7	0.2-0.5			FILL: Silty Clay, medium plasticity, brown, inclusion of gravel	
	0.7-1.2	0.75-0.9			(CH) CLAY, high plasticity, pale brown	

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

APPENDIX B

SECTION 149 (2 & 5) PLANNING CERTIFICATE

PENRITH CITY COUNCIL

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

RECEIVED
17 JUN 2016
BY: .....

Property No: 778156
Your Reference: 1370412 - Post
Contact No: 4722 2700

Issue Date: 14/06/2016
Certificate No: 16/02879
Receipt Date: 14/06/2016
Receipt No: 2601211

Issued to: Geotech Testing Pty Ltd
PO Box 880
PENRITH NSW 2750

PRECINCT 2010

DESCRIPTION OF LAND

County: CUMBERLAND **Parish: MULGOA**

Location: 21-25 Woodriff Street PENRITH NSW 2750
Land Description: Lot 101 DP 1031340

- PART 1 PRESCRIBED MATTERS –

In accordance with the provisions of Section 149(2) of the Act the following information is furnished in respect of the abovementioned land:

1 *NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPs*

1(1) The name of each environmental planning instrument that applies to the carrying out of development on the land:

Penrith Local Environmental Plan 2010, published 22nd September 2010, as amended, applies to the land.

Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2), gazetted 15 September 1995, as amended, applies to the local government area of Penrith.

Sydney Regional Environmental Plan No. 20 - Hawkesbury-Nepean River (No. 2 - 1997), gazetted 7 November 1997, as amended, applies to the local government area of Penrith (except land to which State Environmental Planning Policy (Penrith Lakes Scheme) 1989 applies).

The following State environmental planning policies apply to the land (subject to the exclusions noted below):
State Environmental Planning Policy No.1 - Development Standards. (Note: This policy does not apply to the land to which Penrith Local Environmental Plan 2010 or State Environmental Planning Policy (Western Sydney Employment Area) 2009 apply.)
State Environmental Planning Policy No.19 - Bushland in Urban Areas. (Note: This policy does not apply to certain land referred to in the National Parks and Wildlife Act 1974 and the Forestry Act 1916.)
State Environmental Planning Policy No.21 - Caravan Parks.
State Environmental Planning Policy No.30 - Intensive Agriculture.

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State Environmental Planning Policy No.32 - Urban Consolidation (Redevelopment of Urban Land). (Note: This policy does not apply to land identified as coastal protection, environmental protection, escarpment, floodway, natural hazard, non-urban, rural, rural residential, water catchment or wetland.)
State Environmental Planning Policy No.33 - Hazardous and Offensive Development.
State Environmental Planning Policy No.50 - Canal Estate Development. (Note: This policy does not apply to the land to which State Environmental Planning Policy (Penrith Lakes Scheme) 1989 applies.
State Environmental Planning Policy No.55 - Remediation of Land.
State Environmental Planning Policy No.62 - Sustainable Aquaculture.
State Environmental Planning Policy No.64 - Advertising and Signage.
State Environmental Planning Policy No.65 - Design Quality of Residential Apartment Development.
State Environmental Planning Policy No.70 - Affordable Housing (Revised Schemes).
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Note: This policy applies to land within New South Wales that is land zoned primarily for urban purposes or land that adjoins land zoned primarily for urban purposes, but only as detailed in clause 4 of the policy.)
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004.
State Environmental Planning Policy (Major Development) 2005.
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.
State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007.
State Environmental Planning Policy (Infrastructure) 2007.
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
State Environmental Planning Policy (Affordable Rental Housing) 2009.
State Environmental Planning Policy (State and Regional Development) 2011.

1(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act:
(Information is provided in this section only if a proposed environmental planning instrument that is or has been the subject of community consultation or on public exhibition under the Act will apply to the carrying out of development on the land.)

Draft State Environmental Planning Policy (Infrastructure) Amendment (Shooting Ranges) 2013 applies to the land.

1(3) The name of each development control plan that applies to the carrying out of development on the land:

Penrith Development Control Plan 2014 applies to the land.

2 *ZONING AND LAND USE UNDER RELEVANT LEPs*

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):

2(a)-(d) the identity of the zone; the purposes that may be carried out without development consent; the purposes that may not be carried out except with development consent; and the purposes that are prohibited within the zone. Any zone(s) applying to the land is/are listed below and/or in annexures.

(Note: If no zoning appears in this section see section 1(1) for zoning and land use details (under the Sydney Regional Environmental Plan or State Environmental Planning Policy that zones this property).)

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Zone B4 Mixed Use

(Penrith Local Environmental Plan 2010)

1 Objectives of zone

- To provide a mixture of compatible land uses.
- To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.
- To minimise conflict between land uses within the zone and land uses within adjoining zones.
- To create opportunities to improve public amenity.
- To provide a wide range of retail, business, office, residential, community and other suitable land uses.

2 Permitted without consent

Home occupations

3 Permitted with consent

Amusement centres; Boarding houses; Car parks; Child care centres; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Function centres; Home-based child care; Home businesses; Hostels; Hotel or motel accommodation; Information and education facilities; Medical centres; Mortuaries; Multi dwelling housing; Passenger transport facilities; Places of public worship; Public administration buildings; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Residential accommodation; Residential flat buildings; Respite day care centres; Restricted premises; Roads; Seniors housing; Serviced apartments; Sex services premises; Shop top housing; Signage; Veterinary hospitals.

4 Prohibited

Rural workers' dwellings; Any development not specified in item 2 or 3

Flood planning

All or part of the subject land is identified in Penrith Local Environmental Plan 2010 (PLEP 2010) Clause 7.2 Flood Planning. Development consent is required for any development on land to which Clause 7.2 of PLEP 2010 applies.

Additional information relating to Penrith Local Environmental Plan 2010

Note 1: Under the terms of Clause 2.4 of Penrith Local Environmental Plan 2010 development may be carried out on unzoned land only with development consent.

Note 2: Under the terms of Clause 2.6 of Penrith Local Environmental Plan 2010 land may be subdivided but only with development consent, except for the exclusions detailed in the clause.

Note 3: Under the terms of Clause 2.7 of Penrith Local Environmental Plan 2010 the demolition of a building or work may be carried out only with development consent.

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Note 4: A temporary use may be permitted with development consent subject to the requirements of Clause 2.8 of Penrith Local Environmental Plan 2010.

Note 5: Under the terms of Clause 4.1A of Penrith Local Environmental Plan 2010, despite any other provision of this plan, development consent must not be granted for dual occupancy on an internal lot in Zone R2 Low Density Residential.

Note 6: Under the terms of Clause 5.1 of Penrith Local Environmental Plan 2010 development on land acquired by an authority of the State under the owner-initiated acquisition provisions may, before it is used for the purpose for which it is reserved, be carried out, with development consent, for any purpose.

Note 7: Under the terms of Clause 5.3 of Penrith Local Environmental Plan 2010 development consent may be granted to development of certain land for any purpose that may be carried out in an adjoining zone.

Note 8: Under the terms of Clause 5.9 of Penrith Local Environmental Plan 2010 trees or other vegetation subject to relevant sections of Penrith Development Control Plan 2014 must not be ringbarked, cut down, topped, lopped, removed, injured or wilfully destroyed without the authority conferred by a development consent or a Council permit.

Note 9: Under the terms of Clause 5.9AA of Penrith Local Environmental Plan 2010 (PLEP 2010) any tree or other vegetation that is not of a species or kind prescribed for the purposes of Clause 5.9 of PLEP 2010 by Penrith Development Control Plan 2014 may be ringbarked, cut down, topped, lopped, removed, injured or destroyed without development consent.

Note 10: Clause 5.10 of Penrith Local Environmental Plan 2010 details when development consent is required/not required in relation to heritage conservation.

Note 11: Under the terms of Clause 5.11 of Penrith Local Environmental Plan 2010 bush fire hazard reduction work authorised by the *Rural Fires Act 1997* may be carried out on any land without development consent.

Note 12: Under the terms of Clause 7.1 of Penrith Local Environmental Plan 2010 (PLEP 2010) development consent is required for earthworks unless the work is exempt development under PLEP 2010 or another applicable environmental planning instrument, or the work is ancillary to other development for which development consent has been given.

Note 13: Sex services premises and restricted premises may only be permitted subject to the requirements of Clause 7.23 of Penrith Local Environmental Plan 2010.

2(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed:

(Information is provided in this section only if any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed.)

PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

2(f) whether the land includes or comprises critical habitat:

(Information is provided in this section only if the land includes or comprises critical habitat.)

2(g) whether the land is in a conservation area (however described):

(Information is provided in this section only if the land is in a conservation area (however described).)

2(h) whether an item of environmental heritage (however described) is situated on the land:

(Information is provided in this section only if an item of environmental heritage (however described) is situated on the land.)

2A ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

(Information is provided in this section only if the land is within any zone under State Environmental Planning Policy (Sydney Region Growth Centres) 2006.)

3 COMPLYING DEVELOPMENT

GENERAL HOUSING CODE

(The General Housing Code only applies if the land is within Zones R1, R2, R3, R4 or RU5 under Penrith Local Environmental Plan 2010 or an equivalent zone in a non standard template planning instrument.)

Complying development under the General Housing Code **may** be carried out on the land if the land is within one of the abovementioned zones.

RURAL HOUSING CODE

(The Rural Housing Code only applies if the land is within Zones RU1, RU2, RU3, RU4, RU6 or R5 under Penrith Local Environmental Plan 2010 or an equivalent zone in a non standard template planning instrument.)

Complying development under the Rural Housing Code **may** be carried out on the land if the land is within one of the abovementioned zones.

HOUSING ALTERATIONS CODE

Complying development under the Housing Alterations Code **may** be carried out on the land.

GENERAL DEVELOPMENT CODE

Complying development under the General Development Code **may** be carried out on the land.

COMMERCIAL AND INDUSTRIAL ALTERATIONS CODE

Complying development under the Commercial and Industrial Alterations Code **may** be carried out on the land.

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PLANNING CERTIFICATE UNDER SECTION 149

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SUBDIVISIONS CODE

Complying development under the Subdivisions Code **may** be carried out on the land.

DEMOLITION CODE

Complying development under the Demolition Code **may** be carried out on the land.

COMMERCIAL AND INDUSTRIAL (NEW BUILDINGS AND ADDITIONS) CODE
(The Commercial and Industrial (New Buildings and Additions) Code only applies if the land is within Zones B1, B2, B3, B4, B5, B6, B7, B8, IN1, IN2, IN3, IN4 or SP3 under Penrith Local Environmental Plan 2010 or an equivalent zone in a non standard template planning instrument.)

Complying development under the Commercial and Industrial (New Buildings and Alterations) Code **may** be carried out on the land if the land is within one of the abovementioned zones.

FIRE SAFETY CODE

Complying development under the Fire Safety Code **may** be carried out on the land.

(NOTE: (1) Council has relied on Planning and Infrastructure Circulars and Fact Sheets in the preparation of this information. Applicants should seek their own legal advice in relation to this matter with particular reference to State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

(2) Penrith Local Environmental Plan 2010 (if it applies to the land) contains additional complying development not specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.)

4 COASTAL PROTECTION

The land is not affected by the operation of sections 38 or 39 of the Coastal Protection Act 1979, to the extent that council has been so notified by the Department of Public Works.

5 MINE SUBSIDENCE

The land is not proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

6 ROAD WIDENING AND ROAD REALIGNMENT

The land is not affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) an environmental planning instrument, or
(c) a resolution of council.

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

7 COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

(a) Council Policies

The land is affected by the Asbestos Policy adopted by Council.

The land is not affected by any other policy adopted by the council that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

(b) Other Public Authority Policies

The Bush Fire Co-ordinating Committee has adopted a Bush Fire Risk Management Plan that covers the local government area of Penrith City Council, and includes public, private and Commonwealth lands.

The land is not affected by a policy adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of land slip, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

7A FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

(1) Development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) (if such uses are permissible on the land) is subject to flood related development controls.

(2) Development on the land or part of the land for industrial or commercial purposes (if such uses are permissible on the land) is subject to flood related development controls.

Development on the land or part of the land for purposes other than industrial or commercial, or for purposes other than those referred to in (1) above, will be considered on a merits based approach and flood related development controls may apply.

Note: The land is subject to Penrith Development Control Plan 2014 Section C3.5 Flood Planning. On application and payment of the prescribed fee Council may be able to provide in writing a range of advice in regard to the extent of flooding affecting the property.

8 LAND RESERVED FOR ACQUISITION

No environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

9 CONTRIBUTIONS PLANS

The Cultural Facilities Development Contributions Plan applies anywhere residential development is permitted within the City of Penrith.

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The Penrith City Local Open Space Development Contributions Plan 2007 applies anywhere residential development is permitted within the City of Penrith, excluding industrial areas and the release areas identified in Appendix B of the Plan (Penrith Lakes, Cranebrook, Sydney Regional Environmental Plan No. 30 - St Marys, Waterside, Thornton, the WELL Precinct, Glenmore Park and Erskine Park). See <http://www.penrithcity.nsw.gov.au/uploadedFiles/Content/Website/Our_Services/Planning_and_Development/Planning__Zoning_Information/Local_Planning_Documents/LocalOpenSpaceDCP(1).pdf>

The Penrith City District Open Space Facilities Development Contributions Plan applies anywhere residential development is permitted within the City of Penrith, with the exclusion of industrial lands and the Penrith Lakes development site.

The Penrith City Centre Civic Improvement Plan applies to the land.

9A BIODIVERSITY CERTIFIED LAND

(Information is provided in this section only if the land is biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*).)

10 BIOBANKING AGREEMENTS

(Information is provided in this section only if Council has been notified by the Director-General of the Department of Environment, Climate Change and Water that the land is land to which a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995* relates.)

11 BUSH FIRE PRONE LAND

The land is not identified as bush fire prone land according to Council records.

12 PROPERTY VEGETATION PLANS

(Information is provided in this section only if Council has been notified that the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.)

13 ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

(Information is provided in this section only if Council has been notified that an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.)

14 DIRECTIONS UNDER PART 3A

(Information is provided in this section only if there is a direction by the Minister in force under section 75P(2)(c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect.)

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

15 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS AFFECTING SENIORS HOUSING

(Information is provided in this section only if:

(a) there is a current site compatibility certificate (seniors housing), of which the council is aware, issued under State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land; and/or

(b) any terms of a kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.)

16 SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

(Information is provided in this section only if there is a valid site compatibility certificate (infrastructure), of which council is aware, in respect of proposed development on the land.)

17 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

(Information is provided in this section only if:

(a) there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land; and/or

(b) any terms of a kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 have been imposed as a condition of consent to a development application in respect of the land.)

18 PAPER SUBDIVISION INFORMATION

(Information is provided in this section only if a development plan adopted by a relevant authority applies to the land or is proposed to be subject to a consent ballot, or a subdivision order applies to the land.)

19 SITE VERIFICATION CERTIFICATES

(Information is provided in this section only if there is a current site verification certificate, of which council is aware, in respect of the land.)

NOTE: The following matters are prescribed by section 59(2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate

(a) (Information is provided in this section only if, as at the date of this certificate, the land (or part of the land) is significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.)

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(b) (Information is provided in this section only if, as at the date of this certificate, the land is subject to a management order within the meaning of the Contaminated Land Management Act 1997.)

(c) (Information is provided in this section only if, as at the date of this certificate, the land is the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.)

(d) (Information is provided in this section only if, at the date of this certificate, the land subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.)

(e) (Information is provided in this section only if the land is the subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997 – a copy of which has been provided to Council.)

Note: Section 149(5) information for this property may contain additional information regarding contamination issues.

Note: The Environmental Planning and Assessment Amendment Act 1997 commenced operation on the 1 July 1998. As a consequence of this Act the information contained in this certificate needs to be read in conjunction with the provisions of the Environmental Planning and Assessment (Amendment) Regulation 1998, Environmental Planning and Assessment (Further Amendment) Regulation 1998 and Environmental Planning and Assessment (Savings and Transitional) Regulation 1998 and Environmental Planning and Assessment Regulation 2000.

Information is provided only to the extent that Council has been notified by relevant government departments.

149(5) Certificate
This Certificate is directed to the following relevant matters affecting the land

When information pursuant to section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that section. Council draws your attention to section 149(6) which states that a council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this certificate.

Note:

- Council's 149(5) information does not include development consent or easement information. Details of development consents may be obtained by making enquiries with Council's Development Services Department pursuant to section 12 of the Local Government Act 1993 or (for development applications lodged after January 2007) by viewing the Online Services area at www.penrithcity.nsw.gov.au . Details of any easements may be obtained from a Title Search at Land and Property Information New South Wales.
- This certificate does not contain information relating to Complying Development Certificates.
- This certificate may not provide full details of development rights over the land.
-

* Threatened Species Conservation Act 1995

When considering any development application Council must have regard to the Threatened Species Conservation Act 1995. Please note that this legislation may have application to any land throughout the city. Interested persons should make their own enquiries in regard to the impact that this legislation could have on this land.

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* Preservation of Trees and Vegetation
See Clauses 5.9 and 5.9AA of Penrith Local Environmental Plan 2010 and Chapter C2 of Penrith Development Control Plan 2014 for specific controls relating to the preservation of trees and vegetation.

* Development Control Plan General Information
Penrith Development Control Plan 2014 which applies to the land, sets out requirements for a range of issues that apply across the Penrith Local Government Area, including:

- Site Planning and Design Principles
- Vegetation Management
- Water Management
- Land Management
- Waste Management
- Landscape Design
- Culture and Heritage
- Public Domain
- Advertising and Signage
- Transport, Access and Parking
- Subdivision
- Noise and Vibration, and
- Infrastructure and Services.

The Development Control Plan also specifies requirements relating to various types of land uses including:

- Rural Land Uses
- Residential Development
- Commercial and Retail Development, and
- Industrial Development

as well as for a number of specific activities, including child care centres; health consulting rooms; educational establishments; parent friendly amenities; places of public worship; vehicle repair stations; cemeteries, crematoria and funeral homes; extractive industries; and telecommunication facilities.
The Development Control Plan also details requirements relating to key precincts within the Penrith Local Government Area, including:

- Caddens
- Claremont Meadows Stage 2
- Cranebrook
- Emu Heights
- Emu Plains
- Erskine Business Park
- Glenmore Park
- Kingswood
- Mulgoa Valley
- Orchard Hills
- Penrith
- Penrith Health and Education Precinct

- Riverlink Precinct
- St Clair, and
- St Marys / St Marys North.

Penrith Development Control Plan 2014 may be accessed at https://www.penrithcity.nsw.gov.au/Building-and-Development/Planning-and-Zoning/Planning-Controls/Development-Control-Plans/

* Penrith City Centre Controls

See Part 8 of Penrith Local Environmental Plan 2010 and Chapter E11 of Penrith Development Control Plan 2014 for specific controls relating to Penrith City Centre (which includes the subject property).

* Active Street Frontage

The land is identified as an "Active Street Frontage" on the Penrith Local Environmental Plan 2010 (PLEP 2010) Active Street Frontages Map. See Clause 7.8 of PLEP 2010 for details.

Alan Stoneham
General Manager

PER

APPENDIX C

LABORATORY TEST RESULTS REPORTS/CERTIFICATES
(SGS REPORT REF SE153701, SE153701A, SE153701B & SE150297A
AND
ENVIROLAB REPORT NOS 148525 & 148552)

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-2 Penrith**
Order Number	(Not specified)
Samples	20

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	**SE153701 R1**
Date Received	16/6/2016
Date Reported	28/6/2016

COMMENTS

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

This report cancels and supersedes the report No.SE153701R0. Issued by SGS Environment, Heath and Safety due to the inclusion of metals results for rinsate sample.

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

Sample #6: Asbestos found in 15x10x4mm cement sheet fragment, in >7mm fraction.
Sample #7: Asbestos found loose in sample and 4x2mm cement sheet fragment, in >2 to <7mm fraction.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

VOC's in Soil [AN433] Tested: 20/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017	Duplicate DD1 SOIL - 15/6/2016 SE153701.018	Tripspike TSD1 SOIL - 15/6/2016 SE153701.020
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	[99%]
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	[92%]
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	[97%]
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	[100%]
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	[100%]
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	-
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	-
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	-

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 20/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017	Duplicate DD1 SOIL - 15/6/2016 SE153701.018
TRH C6-C9	mg/kg	20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 20/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	**60**	<45	**67**	<45	<45
TRH C29-C36	mg/kg	45	**130**	<45	**120**	<45	**55**
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**140**	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	**140**	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	**190**	<110	**190**	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
TRH C10-C14	mg/kg	20	<20	<20	<20	**23**	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	**230**	<45
TRH C29-C36	mg/kg	45	<45	**77**	<45	**600**	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	**370**	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	**29**	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	**29**	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	**92**	<90	**570**	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	**630**	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	**850**	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	**1200**	<210

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017	Duplicate DD1 SOIL - 15/6/2016 SE153701.018
TRH C10-C14	mg/kg	20	<20	<20	<20
TRH C15-C28	mg/kg	45	**190**	<45	**350**
TRH C29-C36	mg/kg	45	**560**	<45	**680**
TRH C37-C40	mg/kg	100	**340**	<100	**370**
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	**500**	<90	**750**
TRH >C34-C40 (F4)	mg/kg	120	**580**	<120	**650**
TRH C10-C36 Total	mg/kg	110	**740**	<110	**1000**
TRH C10-C40 Total	mg/kg	210	**1100**	<210	**1400**

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 20/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0.2	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	0.2	0.8	1.0	0.3
Anthracene	mg/kg	0.1	<0.1	<0.1	0.3	0.2	<0.1
Fluoranthene	mg/kg	0.1	0.2	0.7	2.2	3.0	1.2
Pyrene	mg/kg	0.1	0.1	0.6	2.1	2.7	1.0
Benzo(a)anthracene	mg/kg	0.1	<0.1	0.3	1.3	1.0	0.6
Chrysene	mg/kg	0.1	<0.1	0.2	1.0	0.9	0.4
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0.3	1.9	1.4	0.7
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	0.6	0.4	0.3
Benzo(a)pyrene	mg/kg	0.1	<0.1	0.2	1.2	0.9	0.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.1	0.8	0.6	0.3
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.1	0.5	0.4	0.2
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	0.2	1.6	1.2	0.6
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	0.3	1.7	1.3	0.7
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	0.3	1.7	1.3	0.7
Total PAH (18)	mg/kg	0.8	<0.8	2.8	13	12	5.3

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	0.2	<0.1	0.3	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2	<0.1
Phenanthrene	mg/kg	0.1	<0.1	1.1	0.3	2.4	0.2
Anthracene	mg/kg	0.1	<0.1	0.3	<0.1	0.8	<0.1
Fluoranthene	mg/kg	0.1	<0.1	4.3	1.0	7.5	0.6
Pyrene	mg/kg	0.1	<0.1	3.5	0.9	6.3	0.5
Benzo(a)anthracene	mg/kg	0.1	<0.1	2.2	0.5	3.7	0.2
Chrysene	mg/kg	0.1	<0.1	1.5	0.4	2.5	0.2
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	2.6	0.6	4.2	0.2
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.8	0.2	0.8	0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	1.6	0.4	2.3	0.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	1.1	0.3	1.5	0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0.1	<0.1	0.2	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.7	0.2	0.9	0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	2.3	0.5	3.4	0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	2.3	0.6	3.4	0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	2.3	0.6	3.4	0.3
Total PAH (18)	mg/kg	0.8	<0.8	19	4.6	33	2.5

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 20/6/2016 (continued)

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017	Duplicate DD1 SOIL - 15/6/2016 SE153701.018
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	0.2	<0.1	0.2
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	0.7	<0.1	1.3
Anthracene	mg/kg	0.1	0.3	<0.1	0.4
Fluoranthene	mg/kg	0.1	2.9	<0.1	3.7
Pyrene	mg/kg	0.1	2.4	<0.1	3.1
Benzo(a)anthracene	mg/kg	0.1	1.5	<0.1	1.8
Chrysene	mg/kg	0.1	1.2	<0.1	1.4
Benzo(b&j)fluoranthene	mg/kg	0.1	1.8	<0.1	1.8
Benzo(k)fluoranthene	mg/kg	0.1	0.5	<0.1	0.6
Benzo(a)pyrene	mg/kg	0.1	0.9	<0.1	1.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.8	<0.1	1.0
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	0.1
Benzo(ghi)perylene	mg/kg	0.1	0.5	<0.1	0.6
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	1.4	<0.2	1.6
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	1.5	<0.3	1.6
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	1.4	<0.2	1.6
Total PAH (18)	mg/kg	0.8	13	<0.8	17

pH in soil (1:5) [AN101] Tested: 21/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
pH	pH Units	-	**7.4**	**8.5**	**8.7**	**7.7**	**8.1**

PARAMETER	UOM	LOR	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017
pH	pH Units	-	**8.7**

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) [AN122] Tested: 22/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
Exchangeable Sodium, Na	mg/kg	2	15	37	95	64	83
Exchangeable Sodium, Na	meq/100g	0.01	0.06	0.16	0.41	0.28	0.36
Exchangeable Sodium Percentage*	%	0.1	0.7	0.7	1.3	2.6	2.9
Exchangeable Potassium, K	mg/kg	2	480	83	250	82	83
Exchangeable Potassium, K	meq/100g	0.01	1.2	0.21	0.63	0.21	0.21
Exchangeable Potassium Percentage*	%	0.1	12.9	1.0	1.9	2.0	1.7
Exchangeable Calcium, Ca	mg/kg	2	1300	3600	6000	1600	2000
Exchangeable Calcium, Ca	meq/100g	0.01	6.7	18	30	8.0	9.9
Exchangeable Calcium Percentage*	%	0.1	70.8	85.2	90.7	75.8	81.0
Exchangeable Magnesium, Mg	mg/kg	2	180	340	250	250	210
Exchangeable Magnesium, Mg	meq/100g	0.02	1.5	2.8	2.0	2.1	1.7
Exchangeable Magnesium Percentage*	%	0.1	15.6	13.1	6.1	19.6	14.3
Cation Exchange Capacity	meq/100g	0.02	9.5	21	33	11	12

PARAMETER	UOM	LOR	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017
Exchangeable Sodium, Na	mg/kg	2	500
Exchangeable Sodium, Na	meq/100g	0.01	2.2
Exchangeable Sodium Percentage*	%	0.1	14.0
Exchangeable Potassium, K	mg/kg	2	99
Exchangeable Potassium, K	meq/100g	0.01	0.25
Exchangeable Potassium Percentage*	%	0.1	1.6
Exchangeable Calcium, Ca	mg/kg	2	940
Exchangeable Calcium, Ca	meq/100g	0.01	4.7
Exchangeable Calcium Percentage*	%	0.1	30.1
Exchangeable Magnesium, Mg	mg/kg	2	1000
Exchangeable Magnesium, Mg	meq/100g	0.02	8.5
Exchangeable Magnesium Percentage*	%	0.1	54.2
Cation Exchange Capacity	meq/100g	0.02	16

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 22/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
Arsenic, As	mg/kg	3	3	<3	5	7	7
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.6	0.6	<0.3
Chromium, Cr	mg/kg	0.3	12	11	21	22	10
Copper, Cu	mg/kg	0.5	13	21	45	34	27
Lead, Pb	mg/kg	1	44	26	270	380	160
Nickel, Ni	mg/kg	0.5	6.7	10	26	9.0	12
Zinc, Zn	mg/kg	0.5	54	43	470	580	180

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
Arsenic, As	mg/kg	3	6	11	13	<3	7
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	11	14	9.7	17	8.8
Copper, Cu	mg/kg	0.5	14	23	43	51	17
Lead, Pb	mg/kg	1	18	68	72	23	39
Nickel, Ni	mg/kg	0.5	6.6	11	7.7	44	7.3
Zinc, Zn	mg/kg	0.5	22	200	110	62	290

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017	Duplicate DD1 SOIL - 15/6/2016 SE153701.018
Arsenic, As	mg/kg	3	<3	<3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.3
Chromium, Cr	mg/kg	0.3	13	9.9	16
Copper, Cu	mg/kg	0.5	46	17	57
Lead, Pb	mg/kg	1	12	10	15
Nickel, Ni	mg/kg	0.5	39	5.9	66
Zinc, Zn	mg/kg	0.5	41	11	54

Mercury in Soil [AN312] Tested: 21/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
Mercury	mg/kg	0.01	0.08	0.02	0.20	0.49	0.07

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
Mercury	mg/kg	0.01	0.02	0.08	0.10	0.03	0.11

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017	Duplicate DD1 SOIL - 15/6/2016 SE153701.018
Mercury	mg/kg	0.01	<0.01	0.02	0.01

Moisture Content [AN002] Tested: 20/6/2016

PARAMETER	UOM	LOR	TP1a 0-0.15 SOIL - 15/6/2016 SE153701.001	TP2a 0-0.15 SOIL - 15/6/2016 SE153701.002	TP2a 0.5-0.8 SOIL - 15/6/2016 SE153701.003	TP3a 0-0.15 SOIL - 15/6/2016 SE153701.004	TP5a 0-0.15 SOIL - 15/6/2016 SE153701.005
% Moisture	%w/w	0.5	8.2	3.6	12	9.0	6.7

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
% Moisture	%w/w	0.5	11	8.0	5.8	9.9	7.9

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
% Moisture	%w/w	0.5	8.1	6.3	8.7	4.5	7.1

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017	Duplicate DD1 SOIL - 15/6/2016 SE153701.018
% Moisture	%w/w	0.5	3.1	14	4.1

TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC [AN006] Tested: 22/6/2016

PARAMETER	UOM	LOR	TP1a 0-0.15 SOIL - 15/6/2016 SE153701.001	TP2a 0-0.15 SOIL - 15/6/2016 SE153701.002	TP2a 0.5-0.8 SOIL - 15/6/2016 SE153701.003	TP3a 0-0.15 SOIL - 15/6/2016 SE153701.004	TP5a 0-0.15 SOIL - 15/6/2016 SE153701.005
pH 1:20	pH Units	-	9.1	9.4	8.2	9.2	9.2
pH 1:20 plus HCL	pH Units	-	1.9	1.9	1.9	1.9	1.8
Extraction Solution Used	No unit	-	1	1	1	1	1
Mass of Sample Used*	g	-	25	25	25	25	25
Volume of ExtractionSolution Used*	mL	-	500	500	500	500	500
pH TCLP after 18 hours	pH Units	-	5.2	5.2	5.6	6.3	5.3

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract [AN420] Tested: 20/6/2016

PARAMETER	UOM	LOR	TP1a 0-0.15 SOIL - 15/6/2016 SE153701.001	TP2a 0-0.15 SOIL - 15/6/2016 SE153701.002	TP2a 0.5-0.8 SOIL - 15/6/2016 SE153701.003	TP3a 0-0.15 SOIL - 15/6/2016 SE153701.004	TP5a 0-0.15 SOIL - 15/6/2016 SE153701.005
Naphthalene	µg/L	0.1	**0.3**	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	**0.2**	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	**0.2**	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	**1.0**	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	**0.1**	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	**1.2**	**0.1**	<0.1	<0.1	**0.2**
Pyrene	µg/L	0.1	**1.0**	**0.1**	<0.1	<0.1	**0.2**
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	**4**	<1	<1	<1	<1

Gravimetric Determination of Asbestos in Soil [AN605] Tested: 22/6/2016

PARAMETER	UOM	LOR	TP8 0-0.15 SOIL - 15/6/2016 SE153701.006	TP9 0-0.15 SOIL - 15/6/2016 SE153701.007	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701.009	TP11 0.05-0.2 SOIL - 15/6/2016 SE153701.010
Total Sample Weight	g	1	**598**	**830**	**737**	**544**	**760**
ACM in >7mm Sample*	g	0.01	**3.57**	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	**0.0195**	<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	**0.09**	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	**0.002**	<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	**0.002**	<0.001	<0.001	<0.001
Fibre Type	No unit	-	CRY,ORG	CRY,CRO,ORG	NAD,ORG	NAD	NAD

PARAMETER	UOM	LOR	TP11 0.2-0.5 SOIL - 15/6/2016 SE153701.011	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701.012	TP12 0.55-0.85 SOIL - 15/6/2016 SE153701.013	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701.014	TP13 0.2-0.5 SOIL - 15/6/2016 SE153701.015
Total Sample Weight	g	1	**508**	**900**	**728**	**912**	**635**
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	-	NAD	NAD,ORG	NAD,ORG	NAD,ORG	NAD

PARAMETER	UOM	LOR	TP14 0.05-0.2 SOIL - 15/6/2016 SE153701.016	TP14 0.2-0.5 SOIL - 15/6/2016 SE153701.017
Total Sample Weight	g	1	**857**	**516**
ACM in >7mm Sample*	g	0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Fibre Type	No unit	-	NAD	NAD

Metals in Water (Dissolved) by ICPOES [AN320/AN321] Tested: 21/6/2016

PARAMETER	UOM	LOR	Rinsate RD1 WATER - 15/6/2016 SE153701.019
Arsenic, As	mg/L	0.02	<0.02
Cadmium, Cd	mg/L	0.001	<0.001
Chromium, Cr	mg/L	0.005	<0.005
Copper, Cu	mg/L	0.005	<0.005
Lead, Pb	mg/L	0.02	<0.02
Nickel, Ni	mg/L	0.005	<0.005
Zinc, Zn	mg/L	0.01	<0.01

Mercury (dissolved) in Water [AN311/AN312] Tested: 22/6/2016

PARAMETER	UOM	LOR	Rinsate RD1 WATER - 15/6/2016 SE153701.019
Mercury	mg/L	0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
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.
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.
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+.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pre-treated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is refernced to Rayment and Higginson, 1992, sections 15D3 and 15N1.-
AN311/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
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	Carcinogenic PAHs may be expressed as Benzo(a)pyrene equivalents by applying the BaP toxicity equivalence factor (NEPM 1999, June 2013, B7). These can be reported as the individual PAHs and as a sum of carcinogenic PAHs. The sum is reported three ways, the first assuming all <LOR results are zero, the second assuming all < LOR results are half the LOR and the third assuming all <LOR results are the LOR.
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.
AN605	This technique gravimetrically determines the mass of Asbestos Containing Material retained on a 7mm Sieve and assumes that 15% of this ACM is asbestos. This calculated asbestos weight is then calculated as a percentage of the total sample weight.
AN605	This technique also gravimetrically determines the mass of Fibrous Asbestos (FA) and Asbestos Fines (AF) Containing Material retained on and passing a 2mm sieve post 7mm sieving. Assumes that FA and AF are 100% asbestos containing. This calculated asbestos weight is then calculated as a percentage of the total sample weight. This does not include free fibres which are only observed by standard trace analysis as per AN 602.
AN605	AMO = Amosite Detected CRY = Chrysotile Detected CRO = Crocidolite Detected ORG = Organic Fibres Detected SMF = Synthetic Mineral Fibres Detected UMF = Unknown Mineral Fibres Detected NAD = No Asbestos Detected
AN605	Insofar as is technically feasible, this report is consistent with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009.

FOOTNOTES

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

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

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

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

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

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

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

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

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

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

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STATEMENT OF QA/QC PERFORMANCE

SE153701 R1

CLIENT DETAILS

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Client	Geotechnique
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Project	**13704-2 Penrith**
Order Number	(Not specified)
Samples	20

LABORATORY DETAILS

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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE153701 R1**
Date Received	16 Jun 2016
Date Reported	28 Jun 2016

COMMENTS

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

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

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

Duplicate	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	9 items
	Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES	1 item
	Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES	5 items
Matrix Spike	Mercury in Soil	1 item
	Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES	2 items

SAMPLE SUMMARY

Sample counts by matrix	19 Soil, 1 Water	Type of documentation received	COC
Date documentation received	16/6/2016	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	13.1°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE153701 R1

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
TP8 0-0.15	SE153701.006	LB103820	15 Jun 2016	16 Jun 2016	13 Jul 2016	22 Jun 2016	13 Jul 2016	23 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103820	15 Jun 2016	16 Jun 2016	13 Jul 2016	22 Jun 2016	13 Jul 2016	23 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103820	15 Jun 2016	16 Jun 2016	13 Jul 2016	22 Jun 2016	13 Jul 2016	23 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103820	15 Jun 2016	16 Jun 2016	13 Jul 2016	22 Jun 2016	13 Jul 2016	23 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103820	15 Jun 2016	16 Jun 2016	13 Jul 2016	22 Jun 2016	13 Jul 2016	23 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103820	15 Jun 2016	16 Jun 2016	13 Jul 2016	22 Jun 2016	13 Jul 2016	23 Jun 2016

Gravimetric Determination of Asbestos in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP9 0-0.15	SE153701.007	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP12 0.55-0.85	SE153701.013	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103849	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016

Mercury (dissolved) in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate RD1	SE153701.019	LB103785	15 Jun 2016	16 Jun 2016	13 Jul 2016	22 Jun 2016	13 Jul 2016	22 Jun 2016

Mercury in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103764	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP9 0-0.15	SE153701.007	LB103764	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103764	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103764	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103764	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103764	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103764	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP12 0.55-0.85	SE153701.013	LB103765	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103765	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103765	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103765	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103765	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016
Duplicate DD1	SE153701.018	LB103765	15 Jun 2016	16 Jun 2016	13 Jul 2016	21 Jun 2016	13 Jul 2016	23 Jun 2016

Metals in Water (Dissolved) by ICPOES

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate RD1	SE153701.019	LB103701	15 Jun 2016	16 Jun 2016	12 Dec 2016	21 Jun 2016	12 Dec 2016	28 Jun 2016

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1a 0-0.15	SE153701.001	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP2a 0-0.15	SE153701.002	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP2a 0.5-0.8	SE153701.003	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP3a 0-0.15	SE153701.004	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP5a 0-0.15	SE153701.005	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP8 0-0.15	SE153701.006	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP9 0-0.15	SE153701.007	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016

HOLDING TIME SUMMARY

SE153701 R1

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

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

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

Moisture Content (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP12 0.55-0.85	SE153701.013	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016
Duplicate DD1	SE153701.018	LB103599	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	25 Jun 2016	22 Jun 2016

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP9 0-0.15	SE153701.007	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP12 0.55-0.85	SE153701.013	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
Duplicate DD1	SE153701.018	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016

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
TP1a 0-0.15	SE153701.001	LB103650	15 Jun 2016	16 Jun 2016	06 Jul 2016	20 Jun 2016	30 Jul 2016	27 Jun 2016
TP2a 0-0.15	SE153701.002	LB103650	15 Jun 2016	16 Jun 2016	06 Jul 2016	20 Jun 2016	30 Jul 2016	27 Jun 2016
TP2a 0.5-0.8	SE153701.003	LB103650	15 Jun 2016	16 Jun 2016	06 Jul 2016	20 Jun 2016	30 Jul 2016	27 Jun 2016
TP3a 0-0.15	SE153701.004	LB103650	15 Jun 2016	16 Jun 2016	06 Jul 2016	20 Jun 2016	30 Jul 2016	27 Jun 2016
TP5a 0-0.15	SE153701.005	LB103650	15 Jun 2016	16 Jun 2016	06 Jul 2016	20 Jun 2016	30 Jul 2016	27 Jun 2016

pH in soil (1:5)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103812	15 Jun 2016	16 Jun 2016	22 Jun 2016	21 Jun 2016	22 Jun 2016	22 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103812	15 Jun 2016	16 Jun 2016	22 Jun 2016	21 Jun 2016	22 Jun 2016	22 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103812	15 Jun 2016	16 Jun 2016	22 Jun 2016	21 Jun 2016	22 Jun 2016	22 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103812	15 Jun 2016	16 Jun 2016	22 Jun 2016	21 Jun 2016	22 Jun 2016	22 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103812	15 Jun 2016	16 Jun 2016	22 Jun 2016	21 Jun 2016	22 Jun 2016	22 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103812	15 Jun 2016	16 Jun 2016	22 Jun 2016	21 Jun 2016	22 Jun 2016	22 Jun 2016

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
TP1a 0-0.15	SE153701.001	LB103852	15 Jun 2016	16 Jun 2016	29 Jun 2016	22 Jun 2016	06 Jul 2016	23 Jun 2016
TP2a 0-0.15	SE153701.002	LB103852	15 Jun 2016	16 Jun 2016	29 Jun 2016	22 Jun 2016	06 Jul 2016	23 Jun 2016
TP2a 0.5-0.8	SE153701.003	LB103852	15 Jun 2016	16 Jun 2016	29 Jun 2016	22 Jun 2016	06 Jul 2016	23 Jun 2016
TP3a 0-0.15	SE153701.004	LB103852	15 Jun 2016	16 Jun 2016	29 Jun 2016	22 Jun 2016	06 Jul 2016	23 Jun 2016
TP5a 0-0.15	SE153701.005	LB103852	15 Jun 2016	16 Jun 2016	29 Jun 2016	22 Jun 2016	06 Jul 2016	23 Jun 2016

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

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103822	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP9 0-0.15	SE153701.007	LB103822	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103822	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP12 0.55-0.85	SE153701.013	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016

HOLDING TIME SUMMARY

SE153701 R1

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

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

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

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

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Duplicate DD1	SE153701.018	LB103823	15 Jun 2016	16 Jun 2016	12 Dec 2016	22 Jun 2016	12 Dec 2016	23 Jun 2016

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP9 0-0.15	SE153701.007	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP12 0.55-0.85	SE153701.013	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016
Duplicate DD1	SE153701.018	LB103644	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	23 Jun 2016

VOC's in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP9 0-0.15	SE153701.007	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP12 0.55-0.85	SE153701.013	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
Duplicate DD1	SE153701.018	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
Tripspike TSD1	SE153701.020	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016

Volatile Petroleum Hydrocarbons in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP8 0-0.15	SE153701.006	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP9 0-0.15	SE153701.007	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP10 0.05-0.3	SE153701.008	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP10 0.3-0.6	SE153701.009	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP11 0.05-0.2	SE153701.010	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP11 0.2-0.5	SE153701.011	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP12 0.05-0.35	SE153701.012	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP12 0.55-0.85	SE153701.013	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP13 0.05-0.2	SE153701.014	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP13 0.2-0.5	SE153701.015	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP14 0.05-0.2	SE153701.016	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
TP14 0.2-0.5	SE153701.017	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
Duplicate DD1	SE153701.018	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	25 Jun 2016
Tripspike TSD1	SE153701.020	LB103638	15 Jun 2016	16 Jun 2016	29 Jun 2016	20 Jun 2016	30 Jul 2016	27 Jun 2016

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

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

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	TP8 0-0.15	SE153701.006	%	70 - 130%	110
	TP9 0-0.15	SE153701.007	%	70 - 130%	94
	TP10 0.05-0.3	SE153701.008	%	70 - 130%	114
	TP10 0.3-0.6	SE153701.009	%	70 - 130%	102
	TP11 0.05-0.2	SE153701.010	%	70 - 130%	112
	TP11 0.2-0.5	SE153701.011	%	70 - 130%	112
	TP12 0.05-0.35	SE153701.012	%	70 - 130%	108
	TP12 0.55-0.85	SE153701.013	%	70 - 130%	110
	TP13 0.05-0.2	SE153701.014	%	70 - 130%	92
	TP13 0.2-0.5	SE153701.015	%	70 - 130%	78
	TP14 0.05-0.2	SE153701.016	%	70 - 130%	92
	TP14 0.2-0.5	SE153701.017	%	70 - 130%	94
	Duplicate DD1	SE153701.018	%	70 - 130%	76
d14-p-terphenyl (Surrogate)	TP8 0-0.15	SE153701.006	%	70 - 130%	122
	TP9 0-0.15	SE153701.007	%	70 - 130%	126
	TP10 0.05-0.3	SE153701.008	%	70 - 130%	114
	TP10 0.3-0.6	SE153701.009	%	70 - 130%	108
	TP11 0.05-0.2	SE153701.010	%	70 - 130%	106
	TP11 0.2-0.5	SE153701.011	%	70 - 130%	102
	TP12 0.05-0.35	SE153701.012	%	70 - 130%	108
	TP12 0.55-0.85	SE153701.013	%	70 - 130%	110
	TP13 0.05-0.2	SE153701.014	%	70 - 130%	124
	TP13 0.2-0.5	SE153701.015	%	70 - 130%	102
	TP14 0.05-0.2	SE153701.016	%	70 - 130%	120
	TP14 0.2-0.5	SE153701.017	%	70 - 130%	124
	Duplicate DD1	SE153701.018	%	70 - 130%	100
d5-nitrobenzene (Surrogate)	TP8 0-0.15	SE153701.006	%	70 - 130%	120
	TP9 0-0.15	SE153701.007	%	70 - 130%	112
	TP10 0.05-0.3	SE153701.008	%	70 - 130%	122
	TP10 0.3-0.6	SE153701.009	%	70 - 130%	122
	TP11 0.05-0.2	SE153701.010	%	70 - 130%	124
	TP11 0.2-0.5	SE153701.011	%	70 - 130%	118
	TP12 0.05-0.35	SE153701.012	%	70 - 130%	114
	TP12 0.55-0.85	SE153701.013	%	70 - 130%	126
	TP13 0.05-0.2	SE153701.014	%	70 - 130%	112
	TP13 0.2-0.5	SE153701.015	%	70 - 130%	116
	TP14 0.05-0.2	SE153701.016	%	70 - 130%	106
	TP14 0.2-0.5	SE153701.017	%	70 - 130%	118
	Duplicate DD1	SE153701.018	%	70 - 130%	112

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	TP1a 0-0.15	SE153701.001	%	40 - 130%	78
	TP2a 0-0.15	SE153701.002	%	40 - 130%	80
	TP2a 0.5-0.8	SE153701.003	%	40 - 130%	88
	TP3a 0-0.15	SE153701.004	%	40 - 130%	82
	TP5a 0-0.15	SE153701.005	%	40 - 130%	92
d14-p-terphenyl (Surrogate)	TP1a 0-0.15	SE153701.001	%	40 - 130%	122
	TP2a 0-0.15	SE153701.002	%	40 - 130%	122
	TP2a 0.5-0.8	SE153701.003	%	40 - 130%	108
	TP3a 0-0.15	SE153701.004	%	40 - 130%	124
	TP5a 0-0.15	SE153701.005	%	40 - 130%	108
d5-nitrobenzene (Surrogate)	TP1a 0-0.15	SE153701.001	%	40 - 130%	94
	TP2a 0-0.15	SE153701.002	%	40 - 130%	94
	TP2a 0.5-0.8	SE153701.003	%	40 - 130%	110
	TP3a 0-0.15	SE153701.004	%	40 - 130%	106
	TP5a 0-0.15	SE153701.005	%	40 - 130%	116

VOC's in Soil

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

Parameter	Sample Name	Sample Number	Units

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

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

VOC's in Soil (continued)

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	84
	TP9 0-0.15	SE153701.007	%	60 - 130%	73
	TP10 0.05-0.3	SE153701.008	%	60 - 130%	91
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	79
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	74
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	73
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	75
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	74
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	78
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	81
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	120
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	110
	Duplicate DD1	SE153701.018	%	60 - 130%	75
	Tripspike TSD1	SE153701.020	%	60 - 130%	116
d4-1,2-dichloroethane (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	106
	TP9 0-0.15	SE153701.007	%	60 - 130%	90
	TP10 0.05-0.3	SE153701.008	%	60 - 130%	121
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	96
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	92
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	103
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	93
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	96
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	109
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	109
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	99
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	87
	Duplicate DD1	SE153701.018	%	60 - 130%	100
	Tripspike TSD1	SE153701.020	%	60 - 130%	77
d8-toluene (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	91
	TP9 0-0.15	SE153701.007	%	60 - 130%	90
	TP10 0.05-0.3	SE153701.008	%	60 - 130%	108
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	99
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	83
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	91
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	94
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	87
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	101
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	101
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	117
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	96
	Duplicate DD1	SE153701.018	%	60 - 130%	99
	Tripspike TSD1	SE153701.020	%	60 - 130%	74
Dibromofluoromethane (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	99
	TP9 0-0.15	SE153701.007	%	60 - 130%	84
	TP10 0.05-0.3	SE153701.008	%	60 - 130%	110
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	89
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	84
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	99
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	88
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	87
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	104
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	103
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	120
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	106
	Duplicate DD1	SE153701.018	%	60 - 130%	93
	Tripspike TSD1	SE153701.020	%	60 - 130%	70

Volatile Petroleum Hydrocarbons in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	84
	TP9 0-0.15	SE153701.007	%	60 - 130%	73

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

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

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TP10 0.05-0.3	SE153701.008	%	60 - 130%	91
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	79
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	74
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	73
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	75
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	74
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	78
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	81
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	120
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	110
	Duplicate DD1	SE153701.018	%	60 - 130%	75
d4-1,2-dichloroethane (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	106
	TP9 0-0.15	SE153701.007	%	60 - 130%	90
	TP10 0.05-0.3	SE153701.008	%	60 - 130%	121
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	96
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	92
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	103
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	93
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	96
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	109
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	109
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	99
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	87
	Duplicate DD1	SE153701.018	%	60 - 130%	100
d8-toluene (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	91
	TP9 0-0.15	SE153701.007	%	60 - 130%	90
	TP10 0.05-0.3	SE153701.008	%	60 - 130%	108
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	99
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	83
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	91
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	94
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	87
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	101
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	101
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	117
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	96
	Duplicate DD1	SE153701.018	%	60 - 130%	99
Dibromofluoromethane (Surrogate)	TP8 0-0.15	SE153701.006	%	60 - 130%	99
	TP9 0-0.15	SE153701.007	%	60 - 130%	84
	TP10 0.05-0.3	SE153701.008	%	60 - 130%	110
	TP10 0.3-0.6	SE153701.009	%	60 - 130%	89
	TP11 0.05-0.2	SE153701.010	%	60 - 130%	84
	TP11 0.2-0.5	SE153701.011	%	60 - 130%	99
	TP12 0.05-0.35	SE153701.012	%	60 - 130%	88
	TP12 0.55-0.85	SE153701.013	%	60 - 130%	87
	TP13 0.05-0.2	SE153701.014	%	60 - 130%	104
	TP13 0.2-0.5	SE153701.015	%	60 - 130%	103
	TP14 0.05-0.2	SE153701.016	%	60 - 130%	120
	TP14 0.2-0.5	SE153701.017	%	60 - 130%	106
	Duplicate DD1	SE153701.018	%	60 - 130%	93

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

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

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

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

Sample Number	Parameter	Units	LOR

Mercury (dissolved) in Water

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

Sample Number	Parameter	Units	LOR	Result
LB103785.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB103764.001	Mercury	mg/kg	0.01	<0.01
LB103765.001	Mercury	mg/kg	0.01	<0.01

Metals in Water (Dissolved) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result
LB103701.001	Zinc, Zn	mg/L	0.01	<0.01

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB103644.001		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)	%	-	128
		2-fluorobiphenyl (Surrogate)	%	-	88
		d14-p-terphenyl (Surrogate)	%	-	104

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Sample Number	Parameter	Units	LOR	Result
LB103650.001	Naphthalene	µg/L	0.1	<0.1
	2-methylnaphthalene	µg/L	0.1	<0.1
	1-methylnaphthalene	µg/L	0.1	<0.1
	Acenaphthylene	µg/L	0.1	<0.1
	Acenaphthene	µg/L	0.1	<0.1
	Fluorene	µg/L	0.1	<0.1
	Phenanthrene	µg/L	0.1	<0.1
	Anthracene	µg/L	0.1	<0.1
	Fluoranthene	µg/L	0.1	<0.1
	Pyrene	µg/L	0.1	<0.1
	Benzo(a)anthracene	µg/L	0.1	<0.1
	Chrysene	µg/L	0.1	<0.1
	Benzo(a)pyrene	µg/L	0.1	<0.1
	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

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 TCLP Extract (continued)

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

Sample Number		Parameter	Units	LOR	Result
LB103650.001	Surrogates	d5-nitrobenzene (Surrogate)	%	-	76
		2-fluorobiphenyl (Surrogate)	%	-	70
		d14-p-terphenyl (Surrogate)	%	-	74

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

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

Sample Number	Parameter	Units	LOR	Result
LB103822.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5
LB103823.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB103644.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB103638.001	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1
	Hydrocarbons	Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	86
		d4-1,2-dichloroethane (Surrogate)	%	-	87
		d8-toluene (Surrogate)	%	-	94
		Bromofluorobenzene (Surrogate)	%	-	74
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB103638.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	86
		d4-1,2-dichloroethane (Surrogate)	%	-	87
		d8-toluene (Surrogate)	%	-	94

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

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

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

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

Mercury in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153679.006	LB103764.014	Mercury	mg/kg	0.01	<0.01	<0.01	200	0
SE153701.012	LB103764.024	Mercury	mg/kg	0.01	0.08	0.08	93	11
SE153717.004	LB103765.014	Mercury	mg/kg	0.01	0.04	0.04	159	0
SE153717.013	LB103765.024	Mercury	mg/kg	0.01	0.04	0.04	147	0

Metals in Water (Dissolved) by ICPOES

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153701.019	LB103701.022	Zinc, Zn	mg/L	0.01	<0.01	<0.01	200	0

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153701.001	LB103599.011	% Moisture	%w/w	0.5	8.2	7.7	43	6
SE153701.011	LB103599.022	% Moisture	%w/w	0.5	8.1	8.2	42	1
SE153701.018	LB103599.030	% Moisture	%w/w	0.5	4.1	4.2	54	4

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153701.015	LB103644.014		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	0.2	0.2	84	5
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	0.6	0.6	47	3
			Pyrene	mg/kg	0.1	0.5	0.5	49	6
			Benzo(a)anthracene	mg/kg	0.1	0.2	0.2	72	0
			Chrysene	mg/kg	0.1	0.2	0.2	74	4
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.2	0.2	73	9
			Benzo(k)fluoranthene	mg/kg	0.1	0.1	0.1	130	0
			Benzo(a)pyrene	mg/kg	0.1	0.2	0.2	95	6
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.1	0.1	104	7
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0.1	<0.1	135	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	0.2	0.2	99	6
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	0.3	0.3	102	4
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	0.3	0.3	82	5
			Total PAH (18)	mg/kg	0.8	2.5	2.3	63	8
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	0
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE153701.018	LB103644.021		Naphthalene	mg/kg	0.1	<0.1	0.04	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	0.03	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	0.03	200	0
			Acenaphthylene	mg/kg	0.1	0.2	0.32	68	42
			Acenaphthene	mg/kg	0.1	<0.1	0.08	173	0
			Fluorene	mg/kg	0.1	<0.1	0.13	121	26
			Phenanthrene	mg/kg	0.1	1.3	2.07	36	49 ⑧
			Anthracene	mg/kg	0.1	0.4	0.59	50	41
			Fluoranthene	mg/kg	0.1	3.7	5.51	32	38 ⑧
			Pyrene	mg/kg	0.1	3.1	4.73	33	40 ⑧
			Benzo(a)anthracene	mg/kg	0.1	1.8	2.53	35	36 ⑧
			Chrysene	mg/kg	0.1	1.4	2.1	36	41 ⑧
			Benzo(b&j)fluoranthene	mg/kg	0.1	1.8	2.43	35	33
			Benzo(k)fluoranthene	mg/kg	0.1	0.6	0.62	46	2
			Benzo(a)pyrene	mg/kg	0.1	1.0	1.43	38	33
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1.0	1.35	39	35
			Dibenzo(ah)anthracene	mg/kg	0.1	0.1	0.15	110	40

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 %
SE153701.018	LB103644.021		Benzo(ghi)perylene	mg/kg	0.1	0.6	0.85	44	31
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	1.6	2.2875	20	34 ⑧
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	1.6	2.2875	25	34 ⑧
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	1.6	2.2875	20	34 ⑧
			Total PAH (18)	mg/kg	0.8	17	24.66	34	39 ⑧
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	30	7
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.52	30	4

pH in soil (1:5)

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153701.010	LB103812.014	pH	pH Units	-	8.7	8.6	31	1
SE153702.007	LB103812.025	pH	pH Units	-	5.4	5.4	32	0

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

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153679.002	LB103822.014	Arsenic, As	mg/kg	3	<3	<3	84	36
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	183	0
		Chromium, Cr	mg/kg	0.3	24	9.1	33	89 ②
		Copper, Cu	mg/kg	0.5	54	53	31	3
		Lead, Pb	mg/kg	1	10	8	41	19
		Nickel, Ni	mg/kg	0.5	14	12	34	17
		Zinc, Zn	mg/kg	0.5	32	30	37	7
SE153701.008	LB103822.024	Arsenic, As	mg/kg	3	5	5	51	4
		Cadmium, Cd	mg/kg	0.3	0.6	0.6	80	3
		Chromium, Cr	mg/kg	0.3	21	17	33	21
		Copper, Cu	mg/kg	0.5	45	42	31	7
		Lead, Pb	mg/kg	1	270	260	30	1
		Nickel, Ni	mg/kg	0.5	26	21	32	22
		Zinc, Zn	mg/kg	0.5	470	550	30	16
SE153701.018	LB103823.014	Arsenic, As	mg/kg	3	<3	<3	84	37
		Cadmium, Cd	mg/kg	0.3	0.3	<0.3	145	6
		Chromium, Cr	mg/kg	0.3	16	8.3	34	64 ②
		Copper, Cu	mg/kg	0.5	57	48	31	16
		Lead, Pb	mg/kg	1	15	9	38	55 ②
		Nickel, Ni	mg/kg	0.5	66	39	31	51 ②
		Zinc, Zn	mg/kg	0.5	54	35	34	44 ②
SE153717.009	LB103823.024	Arsenic, As	mg/kg	3	7	7	44	9
		Cadmium, Cd	mg/kg	0.3	0.6	0.5	87	23
		Chromium, Cr	mg/kg	0.3	24	20	32	15
		Copper, Cu	mg/kg	0.5	16	15	33	10
		Lead, Pb	mg/kg	1	28	26	34	7
		Nickel, Ni	mg/kg	0.5	10	7.0	36	38 ②
		Zinc, Zn	mg/kg	0.5	36	28	36	26

TRH (Total Recoverable Hydrocarbons) in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153701.015	LB103644.014		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

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

Original	Duplicate	Parameter	Units	LOR

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

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

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

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

VOC's in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153701.013	LB103638.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	5.0	50	14
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.2	50	9
			d8-toluene (Surrogate)	mg/kg	-	4.4	4.8	50	8
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	3.9	50	4
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE153701.018	LB103638.022	Monocyclic	Benzene	mg/kg	0.1	<0.1	0.01	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	0	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	0.03	200	0
			m/p-xylene	mg/kg	0.2	<0.2	0.04	200	0
			o-xylene	mg/kg	0.1	<0.1	0.02	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	5.32	50	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.0	5.79	50	14
			d8-toluene (Surrogate)	mg/kg	-	5.0	6.19	50	22
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	5.02	50	29
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	0.06	200	0
			Total BTEX	mg/kg	0.6	<0.6	0.1	200	0

Volatile Petroleum Hydrocarbons in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE153701.013	LB103638.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	5.0	30	14
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.2	30	9
			d8-toluene (Surrogate)	mg/kg	-	4.4	4.8	30	8
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	3.9	30	4
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE153701.018	LB103638.022		TRH C6-C10	mg/kg	25	<25	0.01	200	0
			TRH C6-C9	mg/kg	20	<20	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	5.32	30	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.0	5.79	30	14
			d8-toluene (Surrogate)	mg/kg	-	5.0	6.19	30	22
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	5.02	30	29
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	0.01	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	-0.09	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 %
LB103820.002	Exchangeable Sodium, Na	mg/kg	2	NA	390	80 - 120	90
	Exchangeable Potassium, K	mg/kg	2	NA	343	80 - 120	87
	Exchangeable Calcium, Ca	mg/kg	2	NA	2570	80 - 120	91
	Exchangeable Magnesium, Mg	mg/kg	2	NA	635	80 - 120	90

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103764.002	Mercury	mg/kg	0.01	0.21	0.2	70 - 130	105
LB103765.002	Mercury	mg/kg	0.01	0.21	0.2	70 - 130	105

Metals in Water (Dissolved) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103701.002	Zinc, Zn	mg/L	0.01	2.0	2	80 - 120	101

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103644.002		Naphthalene	mg/kg	0.1	3.7	4	60 - 140	94
		Acenaphthylene	mg/kg	0.1	3.8	4	60 - 140	95
		Acenaphthene	mg/kg	0.1	3.8	4	60 - 140	95
		Phenanthrene	mg/kg	0.1	3.7	4	60 - 140	93
		Anthracene	mg/kg	0.1	3.8	4	60 - 140	94
		Fluoranthene	mg/kg	0.1	3.8	4	60 - 140	94
		Pyrene	mg/kg	0.1	3.7	4	60 - 140	91
		Benzo(a)pyrene	mg/kg	0.1	3.0	4	60 - 140	75
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.5	40 - 130	120
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103650.002		Naphthalene	µg/L	0.1	26	40	60 - 140	66
		Acenaphthylene	µg/L	0.1	30	40	60 - 140	76
		Acenaphthene	µg/L	0.1	28	40	60 - 140	70
		Phenanthrene	µg/L	0.1	26	40	60 - 140	64
		Anthracene	µg/L	0.1	30	40	60 - 140	74
		Fluoranthene	µg/L	0.1	32	40	60 - 140	80
		Pyrene	µg/L	0.1	27	40	60 - 140	67
		Benzo(a)pyrene	µg/L	0.1	25	40	60 - 140	63
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.2	0.5	40 - 130	46
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	56
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	74

pH in soil (1:5)

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103812.003	pH	pH Units	-	7.5	7.415	98 - 102	101

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

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103822.002	Arsenic, As	mg/kg	3	50	50	80 - 120	99
	Cadmium, Cd	mg/kg	0.3	49	50	80 - 120	99
	Chromium, Cr	mg/kg	0.3	48	50	80 - 120	97
	Copper, Cu	mg/kg	0.5	50	50	80 - 120	99
	Lead, Pb	mg/kg	1	49	50	80 - 120	99
	Nickel, Ni	mg/kg	0.5	49	50	80 - 120	99
	Zinc, Zn	mg/kg	0.5	50	50	80 - 120	99
LB103823.002	Arsenic, As	mg/kg	3	52	50	80 - 120	103
	Cadmium, Cd	mg/kg	0.3	50	50	80 - 120	100
	Chromium, Cr	mg/kg	0.3	50	50	80 - 120	100
	Copper, Cu	mg/kg	0.5	51	50	80 - 120	101

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

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

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

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103823.002		Lead, Pb	mg/kg	1	50	50	80 - 120	99
		Nickel, Ni	mg/kg	0.5	51	50	80 - 120	102
		Zinc, Zn	mg/kg	0.5	52	50	80 - 120	104

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103644.002		TRH C10-C14	mg/kg	20	36	40	60 - 140	90
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	88
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	73
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	36	40	60 - 140	90
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	80
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	75

VOC's in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103638.002	Monocyclic	Benzene	mg/kg	0.1	2.1	2.9	60 - 140	73
	Aromatic	Toluene	mg/kg	0.1	2.5	2.9	60 - 140	87
		Ethylbenzene	mg/kg	0.1	1.8	2.9	60 - 140	61
		m/p-xylene	mg/kg	0.2	3.9	5.8	60 - 140	67
		o-xylene	mg/kg	0.1	1.8	2.9	60 - 140	62
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	5	60 - 140	72
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.9	5	60 - 140	78
		d8-toluene (Surrogate)	mg/kg	-	3.8	5	60 - 140	75
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.6	5	60 - 140	112

Volatile Petroleum Hydrocarbons in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103638.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	79
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	70
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	5	60 - 140	72
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.9	5	60 - 140	78
		d8-toluene (Surrogate)	mg/kg	-	3.8	5	60 - 140	75
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.6	5	60 - 140	112
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	104

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

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

Mercury (dissolved) in Water

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153530.001	LB103785.007	Mercury	mg/L	0.0001	0.0079	<0.0001	0.008	100

Mercury in Soil

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153613.001	LB103764.004	Mercury	mg/kg	0.01	0.22	0.08	0.2	68 ④
SE153701.013	LB103765.004	Mercury	mg/kg	0.01	0.29	0.10	0.2	93

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE153701.006	LB103644.019		Naphthalene	mg/kg	0.1	<0.1	4	90
			2-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	<0.1	4	95
			Acenaphthene	mg/kg	0.1	<0.1	4	88
			Fluorene	mg/kg	0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	<0.1	4	91
			Anthracene	mg/kg	0.1	<0.1	4	90
			Fluoranthene	mg/kg	0.1	0.2	4	96
			Pyrene	mg/kg	0.1	0.1	4	92
			Benzo(a)anthracene	mg/kg	0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	<0.1	4	75
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	-	116
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.6	-	92
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	-	122

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

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153627.001	LB103822.004	Cadmium, Cd	mg/kg	0.3	45	<0.1	50	90
SE153701.009	LB103823.004	Arsenic, As	mg/kg	3	52	7	50	89
		Cadmium, Cd	mg/kg	0.3	42	0.6	50	83
		Chromium, Cr	mg/kg	0.3	63	22	50	83
		Copper, Cu	mg/kg	0.5	72	34	50	77
		Lead, Pb	mg/kg	1	370	380	50	-18 ⑨
		Nickel, Ni	mg/kg	0.5	52	9.0	50	85
		Zinc, Zn	mg/kg	0.5	510	580	50	-127 ⑨

TRH (Total Recoverable Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE153701.006	LB103644.019		TRH C10-C14	mg/kg	20	<20	40	103
			TRH C15-C28	mg/kg	45	60	40	80
			TRH C29-C36	mg/kg	45	130	40	113
			TRH C37-C40	mg/kg	100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	190	-	-
			TRH C10-C40 Total	mg/kg	210	<210	-	-
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	40	90
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	75
			TRH >C34-C40 (F4)	mg/kg	120	140	-	-

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

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153685.001	LB103638.004	Monocyclic	Benzene	mg/kg	0.1	1.8	<0.1	2.9	62
		Aromatic	Toluene	mg/kg	0.1	3.1	<0.1	2.9	107
			Ethylbenzene	mg/kg	0.1	2.0	<0.1	2.9	68
			m/p-xylene	mg/kg	0.2	4.2	<0.2	5.8	71
			o-xylene	mg/kg	0.1	2.0	<0.1	2.9	70
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	3.8	-	88
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	4.1	-	106
			d8-toluene (Surrogate)	mg/kg	-	5.6	4.3	-	111
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.0	3.7	-	99
		Totals	Total Xylenes*	mg/kg	0.3	6.2	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE153685.001	LB103638.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	83
			TRH C6-C9	mg/kg	20	<20	<20	23.2	74
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	3.8	-	88
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	4.1	-	106
			d8-toluene (Surrogate)	mg/kg	-	5.6	4.3	-	111
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.0	3.7	-	99
		VPH F	Benzene (F0)	mg/kg	0.1	1.8	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	102

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

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

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

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

COC received 16/6/16 @ 3:01 pm

SGS Alexandria Environmental

SE153701 COC
Received: 16 – Jun – 2016

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES UNIT 16 33 MADDOX STREET ALEXANDRIA NSW 2015		**Sampling By:** JH	**Job No:** 13704/2
			Project:
PH: 02 8594 0400	**FAX:** 02 8594 0499	**Project Manager:** AB	**Location:** Penrith
ATTN: MS EMILY YIN			

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	TCLP PAH	BTEX		KEEP SAMPLE
1	TP1a	0-0.15	15/06/2016	-	SG/SP									✓			YES
	TP1a	0.5-0.7	15/06/2016	-	SG/SP												YES
	TP1a	0.75-0.9	15/06/2016	-	SG/SP												YES
2	TP2a	0-0.15	15/06/2016	-	SG/SP									✓			YES
3	TP2a	0.5-0.8	15/06/2016	-	SG/SP									✓			YES
	TP2a	0.85-1.0	15/06/2016	-	SG/SP												YES
4	TP3a	0-0.15	15/06/2016	-	SG/SP									✓			YES
	TP3a	0.5-0.8	15/06/2016	-	SG/SP												YES
	TP3a	0.85-1.0	15/06/2016	-	SG/SP												YES
	TP4a	0.75-0.9	15/06/2016	-	SG/SP												YES
5	TP5a	0-0.15	15/06/2016	-	SG/SP									✓			YES
	TP5a	0.5-0.8	15/06/2016	-	SG/SP												YES
	TP5a	0.85-1.0	15/06/2016	-	SG/SP												YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	16/06/2016	A. Ochiano		16/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13704/2

Project:

Project Manager: AB **Location:** Penrith

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	TCLP PAH	BTEX		KEEP SAMPLE
6	TP8	0-0.15	15/06/2016	-	SG/SP		✓	✓	✓			✓	✓				YES
	TP8	0.35-0.5	15/06/2016	-	SG/SP												YES
7	TP9	0-0.15	15/06/2016	-	SG/SP		✓	✓	✓				✓				YES
	TP9	0.45-0.6	15/06/2016	-	SG/SP												YES
8	TP10	0.05-0.3	15/06/2016	-	SG/SP		✓	✓	✓			✓	✓				YES
9	TP10	0.3-0.6	15/06/2016	-	SG/SP		✓	✓	✓				✓				YES
	TP10	0.85-1.0	15/06/2016	-	SG/SP												YES
10	TP11	0.05-0.2	15/06/2016	-	SG/SP		✓	✓	✓			✓	✓				YES
11	TP11	0.2-0.5	15/06/2016	-	SG/SP		✓	✓	✓				✓				YES
	TP11	0.75-0.9	15/06/2016	-	SG/SP												YES
12	TP12	0.05-0.35	15/06/2016	-	SG/SP		✓	✓	✓			✓	✓				YES
13	TP12	0.55-0.85	15/06/2016	-	SG/SP		✓	✓	✓				✓				YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	16/06/2016	A. Ochisno		16/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)	* Purge & Trap
WP	Water sample, plastic bottle			✓	Test required	

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13704/2

Project:

Project Manager: AB **Location:** Penrith

Results required by: Standard Turnaround Time

	Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	TCLP PAH	BTEX		KEEP SAMPLE
	TP12	0.95-1.0	15/06/2016	-	SG/SP												YES
14	TP13	0.05-0.2	15/06/2016	-	SG/SP		✓	✓	✓				✓				YES
15	TP13	0.2-0.5	15/06/2016	-	SG/SP		✓	✓	✓			✓	✓				YES
	TP13	0.75-0.9	15/06/2016	-	SG/SP												YES
16	TP14	0.05-0.2	15/06/2016	-	SG/SP		✓	✓	✓				✓				YES
17	TP14	0.2-0.5	15/06/2016	-	SG/SP		✓	✓	✓			✓	✓				YES
	TP14	0.75-0.9	15/06/2016	-	SG/SP												YES
18	Duplicate DD1		15/06/2016	-	SG		✓	✓	✓								YES
	Duplicate DD2		15/06/2016	-	SG												YES
19	Rinsate RD1		15/06/2016	-		WG/Vial	✓										YES
20	Tripspike TSD1				Sand										✓		YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	16/06/2016	A. Colisno		16/6/16 @ 2pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE153701

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-2 Penrith**
Order Number	(Not specified)
Samples	20

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 16/6/2016
Report Due	Thu 23/6/2016
SGS Reference	**SE153701**

SUBMISSION DETAILS

This is to confirm that 20 samples were received on Thursday 16/6/2016. Results are expected to be ready by Thursday 23/6/2016. Please quote SGS reference SE153701 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	19 Soil, 1 Water	Type of documentation received	COC
Date documentation received	16/6/2016	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	13.1°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

16 soil samples, which were not marked for analyses on the COC, have been placed on hold.

SAMPLE RECEIPT ADVICE

SE153701

CLIENT DETAILS

Client Geotechnique

Project 13704-2 Penrith

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	pH in soil (1:5)	Total Recoverable Metals in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
006	TP8 0-0.15	13	25	1	7	10	12	8
007	TP9 0-0.15	-	25	-	7	10	12	8
008	TP10 0.05-0.3	13	25	1	7	10	12	8
009	TP10 0.3-0.6	-	25	-	7	10	12	8
010	TP11 0.05-0.2	13	25	1	7	10	12	8
011	TP11 0.2-0.5	-	25	-	7	10	12	8
012	TP12 0.05-0.35	13	25	1	7	10	12	8
013	TP12 0.55-0.85	-	25	-	7	10	12	8
014	TP13 0.05-0.2	-	25	-	7	10	12	8
015	TP13 0.2-0.5	13	25	1	7	10	12	8
016	TP14 0.05-0.2	-	25	-	7	10	12	8
017	TP14 0.2-0.5	13	25	1	7	10	12	8
018	Duplicate DD1	-	25	-	7	10	12	8
020	Tripspike TSD1	-	-	-	-	-	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

SE153701

CLIENT DETAILS

Client Geotechnique

Project 13704-2 Penrith

SUMMARY OF ANALYSIS

No.	Sample ID	Gravimetric Determination of Asbestos in Soil	Mercury (dissolved) in Water	Mercury in Soil	Metals in Water (Dissolved) by ICPOES	Moisture Content	PAH (Polynuclear Aromatic Hydrocarbons) in TCLP	TCLP (Toxicity Characteristic Leaching
001	TP1a 0-0.15	-	-	-	-	1	22	6
002	TP2a 0-0.15	-	-	-	-	1	22	6
003	TP2a 0.5-0.8	-	-	-	-	1	22	6
004	TP3a 0-0.15	-	-	-	-	1	22	6
005	TP5a 0-0.15	-	-	-	-	1	22	6
006	TP8 0-0.15	9	-	1	-	1	-	-
007	TP9 0-0.15	9	-	1	-	1	-	-
008	TP10 0.05-0.3	9	-	1	-	1	-	-
009	TP10 0.3-0.6	9	-	1	-	1	-	-
010	TP11 0.05-0.2	9	-	1	-	1	-	-
011	TP11 0.2-0.5	9	-	1	-	1	-	-
012	TP12 0.05-0.35	9	-	1	-	1	-	-
013	TP12 0.55-0.85	9	-	1	-	1	-	-
014	TP13 0.05-0.2	9	-	1	-	1	-	-
015	TP13 0.2-0.5	9	-	1	-	1	-	-
016	TP14 0.05-0.2	9	-	1	-	1	-	-
017	TP14 0.2-0.5	9	-	1	-	1	-	-
018	Duplicate DD1	-	-	1	-	1	-	-
019	Rinsate RD1	-	1	-	7	-	-	-

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

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
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Email	anwar@geotech.com.au
Project	**13704-2 Penrith - Additional**
Order Number	(Not specified)
Samples	20

LABORATORY DETAILS

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SGS Reference	**SE153701A R0**
Date Received	28/6/2016
Date Reported	29/6/2016

COMMENTS

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

SIGNATORIES

Ly Kim Ha
Organic Section Head

VOCs in Water [AN433] Tested: 29/6/2016

PARAMETER	UOM	LOR	Rinsate RD1 WATER - 15/6/2016 SE153701A.019
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: 29/6/2016

PARAMETER	UOM	LOR	Rinsate RD1 WATER - 15/6/2016 SE153701A.019
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: 28/6/2016

PARAMETER	UOM	LOR	Rinsate RD1 WATER - 15/6/2016 SE153701A.019
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 (F2)	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: 28/6/2016

PARAMETER	UOM	LOR	Rinsate RD1 WATER - 15/6/2016 SE153701A.019
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(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

METHOD	METHODOLOGY SUMMARY
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is not corrected for Naphthalene.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

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

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

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

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

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

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

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

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

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

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

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STATEMENT OF QA/QC PERFORMANCE

SE153701A R0

CLIENT DETAILS

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Project	**13704-2 Penrith - Additional**
Order Number	(Not specified)
Samples	20

LABORATORY DETAILS

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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE153701A R0**
Date Received	28 Jun 2016
Date Reported	29 Jun 2016

COMMENTS

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

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

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

Extraction Date	PAH (Polynuclear Aromatic Hydrocarbons) in Water	1 item
	TRH (Total Recoverable Hydrocarbons) in Water	1 item
	VOCs in Water	1 item
	Volatile Petroleum Hydrocarbons in Water	1 item

SAMPLE SUMMARY

Sample counts by matrix	1 Water	Type of documentation received	COC
Date documentation received	28/6/16@11:13am	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	13.1°C
Sample container provider	SGS	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE153701A 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 Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate RD1	SE153701A.019	LB104291	15 Jun 2016	28 Jun 2016	22 Jun 2016	28 Jun 2016†	07 Aug 2016	29 Jun 2016

TRH (Total Recoverable Hydrocarbons) in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate RD1	SE153701A.019	LB104291	15 Jun 2016	28 Jun 2016	22 Jun 2016	28 Jun 2016†	07 Aug 2016	29 Jun 2016

VOCs in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate RD1	SE153701A.019	LB104310	15 Jun 2016	28 Jun 2016	22 Jun 2016	29 Jun 2016†	08 Aug 2016	29 Jun 2016

Volatile Petroleum Hydrocarbons in Water

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate RD1	SE153701A.019	LB104310	15 Jun 2016	28 Jun 2016	22 Jun 2016	29 Jun 2016†	08 Aug 2016	29 Jun 2016

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

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

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	42
d14-p-terphenyl (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	68
d5-nitrobenzene (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	44

VOCs in Water — Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	100
d4-1,2-dichloroethane (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	128
d8-toluene (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	90
Dibromofluoromethane (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	123

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	100
d4-1,2-dichloroethane (Surrogate)	Rinsate RD1	SE153701A.019	%	60 - 130%	128
d8-toluene (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	90
Dibromofluoromethane (Surrogate)	Rinsate RD1	SE153701A.019	%	40 - 130%	123

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

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

Sample Number		Parameter	Units	LOR	Result
LB104291.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		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)	%	-	106
		2-fluorobiphenyl (Surrogate)	%	-	84
		d14-p-terphenyl (Surrogate)	%	-	116

TRH (Total Recoverable Hydrocarbons) in Water

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

Sample Number		Parameter	Units	LOR	Result
LB104291.001		TRH C10-C14	µg/L	50	<50
		TRH C15-C28	µg/L	200	<200
		TRH C29-C36	µg/L	200	<200
		TRH C37-C40	µg/L	200	<200

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result
LB104310.001	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)	%	-	128
		d4-1,2-dichloroethane (Surrogate)	%	-	124
		d8-toluene (Surrogate)	%	-	90
		Bromofluorobenzene (Surrogate)	%	-	104

Volatile Petroleum Hydrocarbons in Water

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

Sample Number		Parameter	Units	LOR	Result
LB104310.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	128
		d4-1,2-dichloroethane (Surrogate)	%	-	124
		d8-toluene (Surrogate)	%	-	90
		Bromofluorobenzene (Surrogate)	%	-	104

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB104291.002		Naphthalene	µg/L	0.1	37	40	60 - 140	92
		Acenaphthylene	µg/L	0.1	40	40	60 - 140	99
		Acenaphthene	µg/L	0.1	38	40	60 - 140	94
		Phenanthrene	µg/L	0.1	41	40	60 - 140	102
		Anthracene	µg/L	0.1	40	40	60 - 140	100
		Fluoranthene	µg/L	0.1	36	40	60 - 140	91
		Pyrene	µg/L	0.1	46	40	60 - 140	114
		Benzo(a)pyrene	µg/L	0.1	43	40	60 - 140	107
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.6	0.5	40 - 130	112
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	µg/L	-	0.5	0.5	40 - 130	108

TRH (Total Recoverable Hydrocarbons) in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB104291.002		TRH C10-C14	µg/L	50	1000	1200	60 - 140	86
		TRH C15-C28	µg/L	200	1200	1200	60 - 140	97
		TRH C29-C36	µg/L	200	1100	1200	60 - 140	94
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1100	1200	60 - 140	93
		TRH >C16-C34 (F3)	µg/L	500	1200	1200	60 - 140	96
		TRH >C34-C40 (F4)	µg/L	500	570	600	60 - 140	95

VOCs in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB104310.002	Monocyclic	Benzene	µg/L	0.5	51	45.45	60 - 140	112
	Aromatic	Toluene	µg/L	0.5	51	45.45	60 - 140	112
		Ethylbenzene	µg/L	0.5	51	45.45	60 - 140	112
		m/p-xylene	µg/L	1	100	90.9	60 - 140	113
		o-xylene	µg/L	0.5	51	45.45	60 - 140	112
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		d8-toluene (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		Bromofluorobenzene (Surrogate)	µg/L	-	5.2	5	60 - 140	104

Volatile Petroleum Hydrocarbons in Water

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB104310.002		TRH C6-C10	µg/L	50	940	946.63	60 - 140	99
		TRH C6-C9	µg/L	40	770	818.71	60 - 140	94
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.0	5	60 - 140	99
		d8-toluene (Surrogate)	µg/L	-	5.0	5	60 - 140	100
		Bromofluorobenzene (Surrogate)	µg/L	-	5.2	5	60 - 140	104
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	630	639.67	60 - 140	99

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

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

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 tthe performance of this service.
-	Sample not analysed for this analyte.

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

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

COC received 28/6/16 @ 11:13 am

SGS Alexandria Environmental

SE153701A COC
Received: 28 – Jun – 2016

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13704/2

Project:

Project Manager: AB **Location:** Penrith

Results required by: 29 June 2016
SGS Ref No: SE153701

Sampling details				Sample type												
Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	pH, CEC	ASBESTOS 0.001% w/w	TCLP PAH	BTEX		KEEP SAMPLE
TP12	0.95-1.0	15/06/2016	-	SG/SP												YES
TP13	0.05-0.2	15/06/2016	-	SG/SP												YES
TP13	0.2-0.5	15/06/2016	-	SG/SP												YES
TP13	0.75-0.9	15/06/2016	-	SG/SP												YES
TP14	0.05-0.2	15/06/2016	-	SG/SP												YES
TP14	0.2-0.5	15/06/2016	-	SG/SP												YES
TP14	0.75-0.9	15/06/2016	-	SG/SP												YES
Duplicate DD1		15/06/2016	-	SG												YES
Duplicate DD2		15/06/2016	-	SG												YES
19 Rinsate RD1		15/06/2016	-		WG/Vial		✓	✓								YES
Tripspike TSD1				Sand												YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	28/06/2016			28/6/16 11:13

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

SAMPLE RECEIPT ADVICE

SE153701A

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-2 Penrith - Additional**
Order Number	(Not specified)
Samples	20

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Tue 28/6/2016
Report Due	Wed 29/6/2016
SGS Reference	**SE153701A**

SUBMISSION DETAILS

This is to confirm that 20 samples were received on Tuesday 28/6/2016. Results are expected to be ready by Wednesday 29/6/2016. Please quote SGS reference SE153701A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	1 Water	Type of documentation received	COC
Date documentation received	28/6/16@11:13am	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	13.1°C
Sample container provider	SGS	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE153701A

CLIENT DETAILS

Client Geotechnique

Project 13704-2 Penrith - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	PAH (Polynuclear Aromatic Hydrocarbons) in Water	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
019	Rinsate RD1	22	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	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-2 Penrith - Additional**
Order Number	(Not specified)
Samples	20

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	**SE153701B R0**
Date Received	29/6/2016
Date Reported	6/7/2016

COMMENTS

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

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC [AN006] Tested: 1/7/2016

PARAMETER	UOM	LOR	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701B.009	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701B.012	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701B.014
pH 1:20	pH Units	-	7.7	7.8	9.1
pH 1:20 plus HCL	pH Units	-	1.8	1.8	1.8
Extraction Solution Used	No unit	-	1	1	1
Mass of Sample Used*	g	-	25	25	25
Volume of ExtractionSolution Used*	mL	-	500	500	500
pH TCLP after 18 hours	pH Units	-	5.0	5.0	5.1

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract [AN420] Tested: 30/6/2016

PARAMETER	UOM	LOR	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701B.009	TP12 0.05-0.35 SOIL - 15/6/2016 SE153701B.012	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701B.014
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	**0.1**
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	**0.1**
Pyrene	µg/L	0.1	<0.1	<0.1	**0.1**
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1

TCLP (Toxicity Characteristic Leaching Procedure) for Metals [AN006] Tested: 1/7/2016

PARAMETER	UOM	LOR	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701B.008
pH 1:20	pH Units	-	**8.5**
pH 1:20 plus HCL	pH Units	-	**1.8**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**13**
Volume of ExtractionSolution Used*	mL	-	**250**
pH TCLP after 18 hours	pH Units	-	**5.2**

Metals in Soil (TCLP) by ICPOES [AN320/AN321] Tested: 4/7/2016

PARAMETER	UOM	LOR	TP10 0.05-0.3 SOIL - 15/6/2016 SE153701B.008	TP10 0.3-0.6 SOIL - 15/6/2016 SE153701B.009	TP13 0.05-0.2 SOIL - 15/6/2016 SE153701B.014
Lead, Pb	mg/L	0.02	**0.08**	**0.04**	-
Nickel, Ni	mg/L	0.005	-	-	**0.054**

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/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components .
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements . Reference APHA 3120 B.
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 Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

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STATEMENT OF QA/QC PERFORMANCE

SE153701B R0

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-2 Penrith - Additional**
Order Number	(Not specified)
Samples	20

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	**SE153701B R0**
Date Received	29 Jun 2016
Date Reported	06 Jul 2016

COMMENTS

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

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

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

Extraction Date	TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC	3 items

SAMPLE SUMMARY

Sample counts by matrix	4 Soil	Type of documentation received	COC
Date documentation received	29/6/16@3:27pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	13.1°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE153701B 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 Soil (TCLP) by ICPOES

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP10 0.05-0.3	SE153701B.008	LB104597	15 Jun 2016	29 Jun 2016	12 Dec 2016	04 Jul 2016	31 Dec 2016	06 Jul 2016
TP10 0.3-0.6	SE153701B.009	LB104597	15 Jun 2016	29 Jun 2016	12 Dec 2016	04 Jul 2016	31 Dec 2016	06 Jul 2016
TP13 0.05-0.2	SE153701B.014	LB104597	15 Jun 2016	29 Jun 2016	12 Dec 2016	04 Jul 2016	31 Dec 2016	06 Jul 2016

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
TP10 0.3-0.6	SE153701B.009	LB104404	15 Jun 2016	29 Jun 2016	06 Jul 2016	30 Jun 2016	09 Aug 2016	06 Jul 2016
TP12 0.05-0.35	SE153701B.012	LB104404	15 Jun 2016	29 Jun 2016	06 Jul 2016	30 Jun 2016	09 Aug 2016	06 Jul 2016
TP13 0.05-0.2	SE153701B.014	LB104404	15 Jun 2016	29 Jun 2016	06 Jul 2016	30 Jun 2016	09 Aug 2016	06 Jul 2016

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
TP10 0.05-0.3	SE153701B.008	LB104541	15 Jun 2016	29 Jun 2016	12 Dec 2016	01 Jul 2016	12 Dec 2016	06 Jul 2016

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
TP10 0.3-0.6	SE153701B.009	LB104540	15 Jun 2016	29 Jun 2016	29 Jun 2016	01 Jul 2016†	15 Jul 2016	05 Jul 2016
TP12 0.05-0.35	SE153701B.012	LB104540	15 Jun 2016	29 Jun 2016	29 Jun 2016	01 Jul 2016†	15 Jul 2016	05 Jul 2016
TP13 0.05-0.2	SE153701B.014	LB104540	15 Jun 2016	29 Jun 2016	29 Jun 2016	01 Jul 2016†	15 Jul 2016	05 Jul 2016

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

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

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	TP10 0.3-0.6	SE153701B.009	%	40 - 130%	54
	TP12 0.05-0.35	SE153701B.012	%	40 - 130%	52
	TP13 0.05-0.2	SE153701B.014	%	40 - 130%	42
d14-p-terphenyl (Surrogate)	TP10 0.3-0.6	SE153701B.009	%	40 - 130%	76
	TP12 0.05-0.35	SE153701B.012	%	40 - 130%	76
	TP13 0.05-0.2	SE153701B.014	%	40 - 130%	60
d5-nitrobenzene (Surrogate)	TP10 0.3-0.6	SE153701B.009	%	40 - 130%	50
	TP12 0.05-0.35	SE153701B.012	%	40 - 130%	48
	TP13 0.05-0.2	SE153701B.014	%	40 - 130%	42

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 Soil (TCLP) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result
LB104597.001	Lead, Pb	mg/L	0.02	<0.02
	Nickel, Ni	mg/L	0.005	<0.005

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Sample Number		Parameter	Units	LOR	Result
LB104404.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		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)	%	-	70
		2-fluorobiphenyl (Surrogate)	%	-	68
		d14-p-terphenyl (Surrogate)	%	-	70

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 Soil (TCLP) by ICPOES

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB104597.002	Lead, Pb	mg/L	0.02	2.0	2	80 - 120	99
	Nickel, Ni	mg/L	0.005	2.0	2	80 - 120	102

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB104404.002		Naphthalene	µg/L	0.1	30	40	60 - 140	76
		Acenaphthylene	µg/L	0.1	37	40	60 - 140	92
		Acenaphthene	µg/L	0.1	30	40	60 - 140	75
		Phenanthrene	µg/L	0.1	31	40	60 - 140	77
		Anthracene	µg/L	0.1	32	40	60 - 140	79
		Fluoranthene	µg/L	0.1	31	40	60 - 140	77
		Pyrene	µg/L	0.1	29	40	60 - 140	72
		Benzo(a)pyrene	µg/L	0.1	31	40	60 - 140	77
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.4	0.5	40 - 130	70
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	68
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	78

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

SE153701B R0

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

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

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

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

COC received 29/6/16 @ 3:27 pm

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13704/2

Project:

Project Manager: AB **Location:** Penrith

Results required by: Standard Turnaround Time
SGS Ref No: SE153701

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Water	TCLP Pb	TCLP Ni	TCLP PAH							KEEP SAMPLE
TP8	0-0.15	15/06/2016	-	SG/SP											YES
TP8	0.35-0.5	15/06/2016	-	SG/SP											YES
TP9	0-0.15	15/06/2016	-	SG/SP											YES
TP9	0.45-0.6	15/06/2016	-	SG/SP											YES
8 TP10	0.05-0.3	15/06/2016	-	SG/SP		✓									YES
9 TP10	0.3-0.6	15/06/2016	-	SG/SP		✓		✓							YES
TP10	0.85-1.0	15/06/2016	-	SG/SP											YES
TP11	0.05-0.2	15/06/2016	-	SG/SP											YES
TP11	0.2-0.5	15/06/2016	-	SG/SP											YES
TP11	0.75-0.9	15/06/2016	-	SG/SP											YES
12 TP12	0.05-0.35	15/06/2016	-	SG/SP				✓							YES
TP12	0.55-0.85	15/06/2016	-	SG/SP											YES

SGS Alexandria Environmental
SE153701B COC
Received: 29 – Jun – 2016

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	29/06/2016	A. Colisho	AC	29/6/16 @ 5:27 pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS EMILY YIN

Sampling By: JH **Job No:** 13704/2

Project:

Project Manager: AB **Location:** Penrith

Results required by: Standard Turnaround Time
SGS Ref No: SE153701

Sampling details				Sample type												
Location	Depth (m)	Date	Time	Soil	Water	TCLP Pb	TCLP Ni	TCLP PAH								KEEP SAMPLE
TP12	0.95-1.0	15/06/2016	-	SG/SP												YES
14 TP13	0.05-0.2	15/06/2016	-	SG/SP			✓	✓								YES
TP13	0.2-0.5	15/06/2016	-	SG/SP												YES
TP13	0.75-0.9	15/06/2016	-	SG/SP												YES
TP14	0.05-0.2	15/06/2016	-	SG/SP												YES
TP14	0.2-0.5	15/06/2016	-	SG/SP												YES
TP14	0.75-0.9	15/06/2016	-	SG/SP												YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	29/06/2016	A. Colusino	A. C	29/6/16 @3:27pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE153701B

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-2 Penrith - Additional**
Order Number	(Not specified)
Samples	20

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 29/6/2016
Report Due	Wed 6/7/2016
SGS Reference	**SE153701B**

SUBMISSION DETAILS

This is to confirm that 20 samples were received on Wednesday 29/6/2016. Results are expected to be ready by Wednesday 6/7/2016. Please quote SGS reference SE153701B when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	4 Soil	Type of documentation received	COC
Date documentation received	29/6/16@3:27pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	13.1°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

SE153701B

CLIENT DETAILS

Client Geotechnique

Project 13704-2 Penrith - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil (TCLP) by ICPOES	PAH (Polynuclear Aromatic Hydrocarbons) in TCLP	TCLP (Toxicity Characteristic Leaching	TCLP (Toxicity Characteristic Leaching
008	TP10 0.05-0.3	1	-	6	-
009	TP10 0.3-0.6	1	22	-	6
012	TP12 0.05-0.35	-	22	-	6
014	TP13 0.05-0.2	1	22	-	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	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-1 Penrith - Additional**
Order Number	(Not specified)
Samples	17

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	**SE150297A R0**
Date Received	17/6/2016
Date Reported	24/6/2016

COMMENTS

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

SIGNATORIES

Huong Crawford
Production Manager

Kamrul Ahsan
Senior Chemist

TCLP (Toxicity Characteristic Leaching Procedure) for Metals [AN006] Tested: 23/6/2016

PARAMETER	UOM	LOR	TP4 0.5-0.7 SOIL - 21/3/2016 SE150297A.008	TP5 0.0-0.15 SOIL - 21/3/2016 SE150297A.009
pH 1:20	pH Units	-	8.1	9.1
pH 1:20 plus HCL	pH Units	-	1.8	1.8
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	-	5.0	5.1

Metals in Soil (TCLP) by ICPOES [AN320/AN321] Tested: 22/6/2016

PARAMETER	UOM	LOR	TP4 0.5-0.7 SOIL - 21/3/2016 SE150297A.008	TP5 0.0-0.15 SOIL - 21/3/2016 SE150297A.009
Lead, Pb	mg/L	0.02	**0.23**	-
Nickel, Ni	mg/L	0.005	-	**0.034**

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/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components .
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements . Reference APHA 3120 B.

FOOTNOTES

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

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

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

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

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

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

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

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

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

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

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

This report must not be reproduced, except in full.

STATEMENT OF QA/QC PERFORMANCE

SE150297A R0

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-1 Penrith - Additional**
Order Number	(Not specified)
Samples	17

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	**SE150297A R0**
Date Received	17 Jun 2016
Date Reported	24 Jun 2016

COMMENTS

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

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

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

SAMPLE SUMMARY

Sample counts by matrix	2 Soil	Type of documentation received	COC
Date documentation received	17/3/16@11:38am	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	5.8°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE150297A 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 Soil (TCLP) by ICPOES

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP4 0.5-0.7	SE150297A.008	LB103778	21 Mar 2016	17 Jun 2016	17 Sep 2016	22 Jun 2016	19 Dec 2016	24 Jun 2016
TP5 0.0-0.15	SE150297A.009	LB103778	21 Mar 2016	17 Jun 2016	17 Sep 2016	22 Jun 2016	19 Dec 2016	24 Jun 2016

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
TP4 0.5-0.7	SE150297A.008	LB103929	21 Mar 2016	17 Jun 2016	17 Sep 2016	23 Jun 2016	17 Sep 2016	24 Jun 2016
TP5 0.0-0.15	SE150297A.009	LB103929	21 Mar 2016	17 Jun 2016	17 Sep 2016	23 Jun 2016	17 Sep 2016	24 Jun 2016

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

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

No surrogates were required for this job.

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

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

Metals in Soil (TCLP) by ICPOES — **Method: ME-(AU)-[ENV]AN320/AN321**

Sample Number	Parameter	Units	LOR	Result
LB103778.001	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 Soil (TCLP) by ICPOES — **Method: ME-(AU)-[ENV]AN320/AN321**

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB103778.002	Lead, Pb	mg/L	0.02	2.0	2	80 - 120	101
	Nickel, Ni	mg/L	0.005	2.0	2	80 - 120	102

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

SE150297A R0

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

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

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

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

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

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

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

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

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

SGS Alexandria Environmental

SE150297A COC
Received: 17 – Jun – 2016

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO:	**SGS ENVIRONMENTAL SERVICES** **UNIT 16** **33 MADDOX STREET** **ALEXANDRIA NSW 2015**	**Sampling By:** JH	**Job No:** 13704/1
			Project:
PH:	**02 8594 0400** **FAX: 02 8594 0499**	**Project Manager:** AB	**Location:** Penrith
ATTN:	**MS EMILY YIN**		

Results required by: Standard Turnaround Time
SGS Ref No: SE150297

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Water	TCLP of Lead	TCLP of Nickel							SGS Ref:	KEEP SAMPLE
8 TP4	0.5-0.7	18/03/2016	-	SG		✓								SE150297-8	YES
9 TP5	0-0.15	18/03/2016	-	SG			✓							SE150297-9	YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	17/06/2016	Emily Yin		17/6/16 11.38 am

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE150297A

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**13704-1 Penrith - Additional**
Order Number	(Not specified)
Samples	17

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 17/6/2016
Report Due	Fri 24/6/2016
SGS Reference	**SE150297A**

SUBMISSION DETAILS

This is to confirm that 17 samples were received on Friday 17/6/2016. Results are expected to be ready by Friday 24/6/2016. Please quote SGS reference SE150297A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	2 Soil	Type of documentation received	COC
Date documentation received	17/3/16@11:38am	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	5.8°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

COMMENTS

SAMPLE RECEIPT ADVICE

SE150297A

CLIENT DETAILS

Client Geotechnique

Project 13704-1 Penrith - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil (TCLP) by ICPOES	TCLP (Toxicity Characteristic Leaching
008	TP4 0.5-0.7	1	6
009	TP5 0.0-0.15	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 .

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 148525

Client:
Geotechnique Pty Ltd
PO Box 880
Penrith
NSW 2751

Attention: Anwar Barbhuyia

Sample log in details:

Your Reference:	**13704/2, Penrith**		
No. of samples:	2 Soils		
Date samples received / completed instructions received	16/06/16	/	16/06/16

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	23/06/16	/	20/06/16
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

ACCREDITED FOR TECHNICAL COMPETENCE

vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	148525-1
Your Reference	---------- -	Split SD1
Date Sampled	----------	15/06/2016
Type of sample		Soil
Date extracted	-	17/06/2016
Date analysed	-	17/06/2016
TRHC$_6$ - C$_9$	mg/kg	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25
vTPHC$_6$ - 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
Surrogate aaa-Trifluorotoluene	%	97

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	148525-1
Your Reference	----------	Split SD1
	-	
Date Sampled	----------	15/06/2016
Type of sample		Soil
Date extracted	-	17/06/2016
Date analysed	-	17/06/2016
$TRHC_{10}$ - C_{14}	mg/kg	<50
$TRHC_{15}$ - C_{28}	mg/kg	220
$TRHC_{29}$ - C_{36}	mg/kg	690
$TRH>C_{10}$-C_{16}	mg/kg	<50
$TRH>C_{10}$ - C_{16} less Naphthalene (F2)	mg/kg	<50
$TRH>C_{16}$-C_{34}	mg/kg	700
$TRH>C_{34}$-C_{40}	mg/kg	720
Surrogate o-Terphenyl	%	85

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	148525-1 Split SD1 15/06/2016 Soil
Date extracted	-	17/06/2016
Date analysed	-	17/06/2016
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	0.2
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.4
Anthracene	mg/kg	0.1
Fluoranthene	mg/kg	1.7
Pyrene	mg/kg	1.7
Benzo(a)anthracene	mg/kg	1.0
Chrysene	mg/kg	0.9
Benzo(b,j+k)fluoranthene	mg/kg	2
Benzo(a)pyrene	mg/kg	1.1
Indeno(1,2,3-c,d)pyrene	mg/kg	0.9
Dibenzo(a,h)anthracene	mg/kg	0.2
Benzo(g,h,i)perylene	mg/kg	0.8
Benzo(a)pyrene TEQ calc (zero)	mg/kg	1.7
Benzo(a)pyrene TEQ calc(half)	mg/kg	1.7
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	1.7
Total Positive PAHs	mg/kg	11
Surrogate p-Terphenyl-d14	%	98

Acid Extractable metals in soil		
Our Reference:	UNITS	148525-1
Your Reference	----------	Split SD1
	-	
Date Sampled	----------	15/06/2016
Type of sample		Soil
Date prepared	-	17/06/2016
Date analysed	-	17/06/2016
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	16
Copper	mg/kg	69
Lead	mg/kg	12
Mercury	mg/kg	<0.1
Nickel	mg/kg	47
Zinc	mg/kg	37

Moisture		
Our Reference:	UNITS	148525-1
Your Reference	----------	Split SD1
	-	
Date Sampled	----------	15/06/2016
Type of sample		Soil
Date prepared	-	17/06/2016
Date analysed	-	20/06/2016
Moisture	%	2.6

Method ID	Methodology Summary
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-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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-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. 'TEQ 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. 'TEQ 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. 'TEQ 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.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/06/2016	[NT]	[NT]	LCS-3	17/06/2016
Date analysed	-			17/06/2016	[NT]	[NT]	LCS-3	17/06/2016
TRHC6 - C9	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-3	98%
TRHC6 - C10	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-3	98%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-3	121%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-3	78%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-3	100%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-3	96%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-3	91%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	90	[NT]	[NT]	LCS-3	92%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/06/2016	[NT]	[NT]	LCS-3	17/06/2016
Date analysed	-			17/06/2016	[NT]	[NT]	LCS-3	17/06/2016
TRHC10 - C14	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-3	118%
TRHC15 - C28	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	111%
TRHC29 - C36	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	108%
TRH>C10-C16	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-3	118%
TRH>C16-C34	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	111%
TRH>C34-C40	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	108%
Surrogate o-Terphenyl	%		Org-003	88	[NT]	[NT]	LCS-3	100%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/06/2016	[NT]	[NT]	LCS-4	17/06/2016
Date analysed	-			17/06/2016	[NT]	[NT]	LCS-4	17/06/2016
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	83%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	130%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	108%
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	87%
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	81%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	87%
Benzo(b,j +k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	LCS-4	100%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	99	[NT]	[NT]	LCS-4	114%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			17/06/2016	[NT]	[NT]	LCS-4	17/06/2016
Date analysed	-			17/06/2016	[NT]	[NT]	LCS-4	17/06/2016
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	LCS-4	104%
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	LCS-4	99%
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	102%
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	104%
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	99%
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	LCS-4	80%
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	97%
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	99%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161

TO:	ENVIROLAB SERVICES PTY LD 12 ASHLEY STREET CHATSWOOD NSW 2067	**Sampling By:**	JH
		Job No:	13704/2
		Project:	
PH:	02 9910 6200	**FAX:**	02 9910 6201
Project Manager:	AB	**Location:**	Penrith
ATTN:	MS AILEEN HIE		

Results required by: Standard Turnaround Time

Sampling details				Sample type										
Location	Depth (m)	Date	Time	Soil	Water	Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	Combo No					KEEP SAMPLE
1 Split SD1		15/06/2016	-	SG		✓	✓	✓	3					YES
2 Split SD2		15/06/2016	-	SG										YES

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

Job No: 148525
Date Received: 16/6/2016
Time Received: 17:30
Received by: L.N
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	16/06/2016	L.N.	L.N.	16/06/16 17:30

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Geotechnique Pty Ltd
Attention	Anwar Barbhuyia

Sample Login Details	
Your Reference	13704/2, Penrith
Envirolab Reference	**148525**
Date Sample Received	16/06/2016
Date Instructions Received	16/06/2016
Date Results Expected to be Reported	**23/06/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	2 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	12.4
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

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

Sample and Testing Details on following page

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

Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Acid Extractable metals in soil*	*On Hold*
Split SD1	✓	✓	✓	✓	
Split SD2					✓

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 148552

Client:
Geotechnique Pty Ltd
PO Box 880
Penrith
NSW 2751

Attention: Anwar Barbhuyia

Sample log in details:

Your Reference:	**13704/2, Penrith**		
No. of samples:	3 Soils		
Date samples received / completed instructions received	17/06/2016	/	17/06/2016

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	24/06/16	/	21/06/16
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

ACCREDITED FOR TECHNICAL COMPETENCE

Miscellaneous Inorg - soil				
Our Reference:	UNITS	148552-1	148552-2	148552-3
Your Reference	----------	TP10	TP11	TP13
	-			
Depth	----------	0-0.05	0-0.05	0-0.05
Date Sampled		15/06/2016	15/06/2016	15/06/2016
Type of sample		Solid	Solid	Solid
Date prepared	-	20/06/2016	20/06/2016	20/06/2016
Date analysed	-	20/06/2016	20/06/2016	20/06/2016
Coal Tar*	-	Absent	Absent	Absent

Method ID	Methodology Summary
RTA T542	Determination of Phenol in core samples as per RTA test method T542. This procedure gives and indication of whether a sample of asphalt has been made with coal tar. The coal tar method gives an approximate result with a high degree of uncertainty.

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank
Date prepared	-			20/06/2016
Date analysed	-			20/06/2016
Coal Tar*	-		RTA T542	

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

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LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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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.

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: 13704/2

Project:

Project Manager: AB

Location: Penrith

Results required by: Standard Turnaround Time

	Sampling details			Sample type											
	Test Pit	Depth (m)	Date	Time	Material	Water	COAL TAR (RTA Test Method T542)								KEEP SAMPLE
1	TP10	0-0.05	15/06/2016	-	AC/SP		✓								YES
2	TP11	0-0.05	15/06/2016	-	AC/SP		✓								YES
3	TP13	0-0.05	15/06/2016	-	AC/SP		✓								YES

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

Job No: 148552

Date Received: 17/06/2016
Time Received: 11:00
Received by: L.N
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	16/06/2016			17/6/16

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	AC/SP	Asphaltic Concrete (plastic bag)	✓	Test required

* Purge & Trap

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Geotechnique Pty Ltd
Attention	Anwar Barbhuyia

Sample Login Details	
Your Reference	13704/2, Penrith
Envirolab Reference	**148552**
Date Sample Received	17/06/2016
Date Instructions Received	17/06/2016
Date Results Expected to be Reported	**24/06/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	3 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	NA
Cooling Method	Not applicable
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

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

Sample and Testing Details on following page

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

Sample Id	*Coal Tar**
TP10-0-0.05	✓
TP11-0-0.05	✓
TP13-0-0.05	✓

APPENDIX D

WASTE CLASSIFICATION OF FILL MATERIALS IN AREA 1

GEOTECHNIQUE
PTY LTD

TABLE DD1
METALS TEST TESULTS
FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH
(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
TP1	0.0-0.15	<3	0.4	17	40	29	0.01	38	64
TP2	0.0-0.15	4	<0.3	12	44	22	<0.01	24	47
TP2	0.5-0.8	9	<0.3	12	22	58	0.11	13	63
TP3	0.0-0.15	4	0.4	29	40	32	0.02	35	53
TP4	0.0-0.15	<3	<0.3	9.6	65	18	<0.01	19	47
TP5	0.0-0.15	<3	0.3	11	49	16	0.01	47	48
TP6	0.0-0.15	5	<0.3	10	12	19	<0.01	5.5	14
TP7	0.0-0.15	<3	<0.3	8.6	61	9	<0.01	10	27
TP8	0-0.15	3	<0.3	12	13	44	0.08	6.7	54
TP9	0-0.15	<3	<0.3	11	21	26	0.02	10	43
TP10	0.05-0.3	5	0.6	21	45	270	0.2	26	470
TP10	0.3-0.6	7	0.6	22	34	380	0.49	9.0	580
TP11	0.05-0.2	7	<0.3	10	27	160	0.07	12	180
TP12	0.05-0.35	11	<0.3	14	23	68	0.08	11	200
TP13	0.05-0.2	<3	<0.3	17	51	23	0.03	44	62
Duplicate DD1 (TP13 0.05-0.2m)		<3	0.3	16	57	15	0.01	66	54
TP14	0.05-0.2	<3	<0.3	13	46	12	<0.01	39	41
Split SD1 (TP14 0.05-0.2m)		<4	<0.4	16	69	12	<0.1	47	37
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5

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GEOTECHNIQUE
PTY LTD

TABLE DD2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	TPH (mg/kg)					BTEX (mg/kg)			
		C6-C9	C10-C14	C15-C28	C29-C40	C10-C40[a]	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
TP1	0.0-0.15	<20	<20	79	<280	260	<0.1	<0.1	<0.1	<0.3
TP2	0.0-0.15	<20	<20	98	440	540	<0.1	<0.1	<0.1	<0.3
Split S1 (TP2)	0.0-0.15	<25	<50	<100	530	680	<0.1	<0.1	<0.1	<0.3
TP2	0.5-0.8	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP3	0.0-0.15	<20	<20	250	770	1000	<0.1	<0.1	<0.1	<0.3
TP4	0.0-0.15	<20	<20	180	930	1100	<0.1	<0.1	<0.1	<0.3
TP5	0.0-0.15	<20	<20	230	580	800	<0.1	<0.1	<0.1	<0.3
TP6	0.0-0.15	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP7	0.0-0.15	<20	<20	60	<380	340	<0.1	<0.1	<0.1	<0.3
TP8	0-0.15	<20	<20	60	<230	<210	<0.1	<0.1	<0.1	<0.3
TP9	0-0.15	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP10	0.05-0.3	<20	<20	67	<220	<210	<0.1	<0.1	<0.1	<0.3
TP10	0.3-0.6	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP11	0.05-0.2	<20	<20	<45	<155	<210	<0.1	<0.1	<0.1	<0.3
TP12	0.05-0.35	<20	<20	<45	<177	<210	<0.1	<0.1	<0.1	<0.3
TP13	0.05-0.2	<20	23	230	970	1200	<0.1	<0.1	<0.1	<0.3
Duplicate DD1 (TP13 0.05-0.2m)		<20	<20	350	1050	1400	<0.1	<0.1	<0.1	<0.3
TP14	0.05-0.2	<20	<20	190	900	1100	<0.1	<0.1	<0.1	<0.3
Split SD1 (TP14 0.05-0.2m)		<25	<50	220	690	960	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	45	145	210	0.1	0.1	0.1	0.3

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TABLE DD3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH), POLYCHLORINATED BIPHENYLS (PCB), CYANIDES & PHENOLS TEST RESULTS
FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH
(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)	TOTAL CYANIDES (mg/kg)	TOTAL PHENOLS (mg/kg)
TP1	0.0-0.15	2.4	21	<1	<0.5	<5
TP2	0.0-0.15	2.2	20	<1	<0.5	<5
TP2	0.5-0.8	1.4	12	<1	-	<5
TP3	0.0-0.15	4.7	38	<1	-	<5
TP4	0.0-0.15	<0.1	<0.8	<1	<0.5	<5
TP5	0.0-0.15	3.7	47	<1	-	<5
TP6	0.0-0.15	<0.1	<0.8	<1	<0.5	<5
TP7	0.0-0.15	0.1	1.2	<1	-	<5
TP8	0-0.15	<0.1	<0.8	-	-	-
TP9	0-0.15	0.2	2.8	-	-	-
TP10	0.05-0.3	1.2	13	-	-	-
TP10	0.3-0.6	0.9	12	-	-	-
TP11	0.05-0.2	0.5	5.3	-	-	-
TP12	0.05-0.35	1.6	19	-	-	-
TP13	0.05-0.2	2.3	33	-	-	-
TP14	0.05-0.2	0.9	13	-	-	-
Split SD1 (TP14 0.05-0.2m)		1.1	11	-	-	-
Limits of Reporting (LOR)		0.1	0.8	1	0.5	5

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TABLE DD4
ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)														Scheduled Chemical Waste[a] (mg/kg)	Total Endosulfan[b] (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	ENDRIN ALDEHYDE	ISODRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
TP1	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP2	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP2	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP3	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP4	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP5	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP6	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP7	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.1	0.1	0.2	0.2	0.2	0.2	NA	NA

Notes a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW EPA 2014, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 2004.

b: Includes alpha, beta Endosulfan and Endosulfan Sulphate

NA: Not Applicable

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TABLE DD5
TCLP TEST RESULTS OF LEAD, NICKEL AND BENZO(a)PYRENE
FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	LEAD (mg/L)	NICKEL (mg/L)	BENZO(a)PYRENE (mg/L)
TP1a	0-0.15	-	-	<0.0001
TP2a	0-0.15	-	-	<0.0001
TP2a	0.5-0.8	-	-	<0.0001
TP3a	0-0.15	-	-	<0.0001
TP5	0-0.15	-	0.034	-
TP5a	0-0.15	-	-	<0.0001
TP10	0.05-0.3	0.08	-	-
TP10	0.3-0.6	0.04	-	<0.0001
TP12	0.05-0.35	-	-	<0.0001
TP13	0.05-0.2	-	0.054	<0.0001
Limits of Reporting (LOR)		0.02	0.005	0.0001

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TABLE DD6

ASBESTOS TEST RESULTS
FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH
(Ref No: 13704/2-AA)

Sample ID / Location	Depth (m)	ASBESTOS
TP1	0.0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP2	0.0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP2	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP3	0.0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP4	0.0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP5	0.0-0.15	**Friable Chrysotile found (0.001% w/w)**
TP6	0.0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP7	0.0-0.15	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP8	0-0.15	**Bonded Chrysotile Asbestos found (0.09% w/w)**; How ever no friable asbestos found at the limit of reporting of 0.001% w/w
TP9	0-0.15	**Friable Chrysotile and Crocidolite Asbestos Found (0.002% w/w)**
TP10	0.05-0.3	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP10	0.3-0.6	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP11	0.05-0.2	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP12	0.05-0.35	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP13	0.05-0.2	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP14	0.05-0.2	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w

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TABLE DD7
CLASSIFICATION OF FILL MATERIALS IN AREA 1

LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH
(Ref No: 13704/2-AA)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	**Friable Asbestos and Bonded Asbestos Containing Material (ACM)**	-	-	-	-	-	-	-	**Special Waste- Asbestos Waste**
Metals									
Arsenic	11	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.6	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	29*	100	400	1900	7600	ND	5	20	General Solid
Lead	380	100	400	1500	6000	0.08	5	20	General Solid
Mercury	0.49	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	66	40	160	1050	4200	0.054	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<25	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	1400	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<0.3	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	3.7	0.8	3.2	10	23	<0.0001	0.04	0.16	General Solid
Total PAH	47	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Total Cyanide	<0.5	320	1280	5900	23600	ND	16	64	General Solid
Total Phenols	0.5	288	1152	518	2073	ND	14.4	57.6	General Solid
Scheduled Chemicals	<2.1 [2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:
ND: Not Determined
NA: Not Applicable
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, Heptachlor, Heptachlor Epoxide & HCB
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

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APPENDIX E

WASTE CLASSIFICATION OF REMAINING FILL MATERIALS IN THE SITE

GEOTECHNIQUE
PTY LTD

TABLE EE1
METALS TEST TESULTS
REMAINING FILL MATERIALS IN THE SITE (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH
(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
TP1	0.5-0.7	5	<0.3	14	20	26	0.13	17	42
TP3	0.5-0.8	7	0.7	12	30	280	0.30	8.3	370
TP4	0.5-0.7	9	0.4	11	52	650	0.19	13	210
TP5	0.5-0.8	4	<0.3	9.6	18	36	0.07	9.3	48
TP6	0.5-0.7	5	<0.3	10	14	52	0.04	6.3	29
TP7	0.5-0.8	5	<0.3	10	14	60	0.11	8.0	50
TP11	0.2-0.5	6	<0.3	11	14	18	0.02	6.6	22
TP12	0.55-0.85	13	0.3	9.7	43	72	0.10	7.7	110
TP13	0.2-0.5	7	<0.3	8.8	17	39	0.11	7.3	290
TP14	0.2-0.5	<3	<0.3	9.9	17	10	0.02	5.9	11
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5

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GEOTECHNIQUE
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TABLE EE2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
REMAINING FILL MATERIALS IN THE SITE (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	TPH (mg/kg)					BTEX (mg/kg)			
		C6-C9	C10-C14	C15-C28	C29-C40	C10-C40[a]	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
TP1	0.5-0.7	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP3	0.5-0.8	<20	<20	57	<145	<210	<0.1	<0.1	<0.1	<0.3
TP4	0.5-0.7	<20	<20	100	<280	280	<0.1	<0.1	<0.1	<0.3
TP5	0.5-0.8	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP6	0.5-0.7	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP7	0.5-0.8	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP11	0.2-0.5	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP12	0.55-0.85	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP13	0.2-0.5	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
TP14	0.2-0.5	<20	<20	<45	<145	<210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	45	145	210	0.1	0.1	0.1	0.3

GEOTECHNIQUE
PTY LTD

TABLE EE3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH), POLYCHLORINATED BIPHENYLS (PCB), CYANIDES & PHENOLS TEST RESULTS
REMAINING FILL MATERIALS IN THE SITE (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH
(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)	TOTAL CYANIDES (mg/kg)	TOTAL PHENOLS (mg/kg)
TP1	0.5-0.7	0.2	2.3	<1	<0.5	<5
TP3	0.5-0.8	0.5	5.0	<1	-	<5
TP4	0.5-0.7	0.2	2.7	<1	<0.5	<5
TP5	0.5-0.8	<0.1	<0.8	<1	-	<5
TP6	0.5-0.7	<0.1	<0.8	<1	<0.5	<5
TP7	0.5-0.8	<0.1	<0.8	<1	-	<5
TP11	0.2-0.5	<0.1	<0.8	-	-	-
TP12	0.55-0.85	0.4	4.6	-	-	-
TP13	0.2-0.5	0.2	2.5	-	-	-
TP14	0.2-0.5	<0.1	<0.8	-	-	-
Limits of Reporting (LOR)		0.1	0.8	1	0.5	5

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TABLE EE4

ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
REMAINING FILL MATERIALS IN THE SITE (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

(Ref No: 13704/2-AA)

Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)														Scheduled Chemical Waste [a] (mg/kg)	Total Endosulfan [b] (mg/kg)
Analyte		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	ENDRIN ALDEHYDE	ISODRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
TP1	0.5-0.7	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP3	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP4	0.5-0.7	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP5	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP6	0.5-0.7	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP7	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.1	0.1	0.2	0.2	0.2	0.2	NA	NA

Notes
a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW EPA 2014, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 2004.
b: Includes alpha, beta Endosulfan and Endosulfan Sulphate
NA: Not Applicable

TABLE EE5
TCLP TEST RESULT OF LEAD

REMAINING FILL MATERIALS IN THE SITE (LANDFILL DISPOSAL)
LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

(Ref No: 13704/2-AA)

Analyte / Sample Location	Depth (m)	LEAD (mg/L)
TP4	0.5-0.7	0.23
Limits of Reporting (LOR)		0.02

TABLE EE6

ASBESTOS TEST RESULTS

REMAINING FILL MATERIALS IN THE SITE (LANDFILL DISPOSAL)

LOT 101 IN DP1031340

21-25 WOODRIFF STREET, PENRITH

(Ref No: 13704/2-AA)

Sample ID / Location	Depth (m)	ASBESTOS
TP1	0.5-0.7	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP3	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP4	0.5-0.7	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP5	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP6	0.5-0.7	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP7	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP11	0.2-0.5	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP12	0.55-0.85	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP13	0.2-0.5	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w
TP14	0.2-0.5	No bonded asbestos found at the limit of reporting of 0.01% w/w and no friable asbestos found at the limit of reporting of 0.001% w/w

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TABLE EE7
CLASSIFICATION OF REMAINING FILL MATERIALS IN THE SITE

LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH
(Ref No: 13704/2-AA)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Metals									
Arsenic	13	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.7	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	14*	100	400	1900	7600	ND	5	20	General Solid
Lead	650	100	400	1500	6000	0.23	5	20	General Solid
Mercury	0.30	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	17	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	280	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<0.3	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	0.5	0.8	3.2	10	23	ND	0.04	0.16	General Solid
Total PAH	5	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Total Cyanide	<0.5	320	1280	5900	23600	ND	16	64	General Solid
Total Phenols	0.5	288	1152	518	2073	ND	14.4	57.6	General Solid
Scheduled Chemicals	<2.1 [2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:
ND: Not Determined
NA: Not Applicable
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, Heptachlor, Heptachlor Epoxide & HCB
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

APPENDIX F

OCCUPATIONAL HEALTH & SAFETY PLAN

GEOTECHNIQUE® PTY LTD

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OCCUPATIONAL HEALTH & SAFETY PLAN

LOT 101 IN DP1031340
21-25 WOODRIFF STREET, PENRITH

SITE SECURITY

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

POTENTIAL CONTAMINANTS

The potential contaminant identified in the disturbed soils to be removed is 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 in the field.

- ***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.
- ***Total Petroleum Hydrocarbons (TPH):*** TPH associated with dust, when present at high concentrations, can affect the respiratory system, causing irritation, coughing, possible chest pains or asthma. Contact of the contaminated soil with the skin and eyes, or inhalation of associated dust, should be prevented.
- ***Asbestos***: Friable Asbestos contains tiny, almost indestructible fibres, which can cause damage to the lungs when breathed in. However, Asbestos containing material (ACM) generally do not present a significant health risk unless tooled, cut, sanded, abraded or machined, which may release asbestos dust or fibres. Asbestos dust contains tiny, almost indestructible fibres, which can cause damage to the lungs when breathed in. According to the IARC, asbestos is a listed known human carcinogen.

Elevated nickel and zinc concentration identified in fill materials at two locations might impact on terrestrial ecosystems, but would not present a risk of harm to human health.

PERSONAL PROTECTIVE EQUIPMENT

Workers will endeavour wherever possible to avoid direct contact with potentially contaminated soil. Workers are to ensure that surface water is not ingested or swallowed and direct skin contact with soil and water is avoided.

In order to minimise exposure to the contaminants within the soils and to ensure the safety of workers, the minimum level of personal protective equipment recommended for workers actively involved in intrusive activities within the site includes:

- 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, complying with AS1715 "Respiratory Protective Devices" for filtering asbestos fibres.
- Nitrile work gloves, complying with AS2161 "Occupational Protective Gloves".

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

All personal protective equipment should be removed on-site at the completion of each day. None of the equipment should be taken home to avoid transfer of the contaminants to the home environment.

Smoking, eating or drinking on site is prohibited whilst the remediation works are being carried out. 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, fill handling activities and soil stockpiling works, should follow appropriate guidelines to prevent excessive dermal contact or inhalation of dust arising from the handling of these materials. All visitors should wear the following personal protective equipment 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 mask, complying with AS1715 "Respiratory Protective Devices" for filtering asbestos fibres.

SAFETY MEASURES AROUND EXCAVATIONS

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

- Seek geotechnical advice regarding battering and temporary support prior to deep excavation.
- Only the minimum number of workers needed to adequately and safely complete the job at hand will be used.
- A water truck or on-site water source will be tapped and utilised to continually dampen the excavation faces to minimise dust generation.

- All personnel performing the works in and around the excavation will wear appropriate personal protective equipment, as listed above.
- Any excavation that is to remain open during non-working hours will be subject to dust suppression controls in the form of protective plastic coverings.
- After completion of excavation, warning signs and exclusion fences should be set up around excavation pits.

No person is to enter any excavation until a risk assessment has been undertaken by the Site Supervisor/Foreman and he/she declares the excavation safe or provides the appropriate safety gear, supports and training to make the excavation safe to work in.

KEY PERSONNEL AND CONTACT TELEPHONE NUMBERS

Contractor's Representative:	Not known at this stage
Project Managers:	Arina Group Pty Ltd Mr William Schrumpf M: 0423 289 547
Asbestos Assessor:	Not known at this stage
Environmental Consultant:	Not known at this stage
Nearest Hospital:	Nepean Hospital Derby Street, Kingswood 02 4734 2000
Emergency Response:	000

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 a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has changed, e.g. from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of e.g. a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible quantify the risks that unrecognised contamination poses to the ongoing proposed activity. Such risks may be financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment might not detect all contamination within a site. Contaminants could be present in areas that were not surveyed or sampled, or migrate to areas that did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant that may occur; only the most likely contaminants are screened.

AN ENVIRONMENTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

In the following events and in order to avoid cost problems, you should ask your consultant to assess any changes in the conclusion and recommendations made in the assessment:

- When the nature of the proposed development is changed e.g. if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered e.g. if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientists and opinions are drawn about the overall sub-surface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason site owners should retain the services of their consultants throughout the development stages of the project in order to identify variances, conduct additional tests that may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by Geotechnique Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data that may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs of specific individuals e.g. an assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another consulting civil engineer.

An assessment should not be used by other persons for any purpose or by the client for a different purpose. No individual, other than the client, should apply an assessment, even for its intended purpose, without first conferring with the consultant. No person should apply an assessment for any purpose other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FROM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists, based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these would not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. Should this occur, delays and disputes, or unanticipated costs may result.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion; therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.