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Report

Remediation Action Plan (RAP)
Proposed Car Park
North Street, Penrith, NSW

Prepared for
Penrith City Council
PO Box 60
PENRITH NSW 2751

Ref: JC17302A-r2(rev)
May 2018

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10th May 2018

Our Ref: JC17302A-r3(rev)

Penrith City Council
PO Box 60
PENRITH NSW 2751

Attention: Mr Kumar Rethnasamy

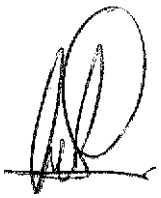
Dear Sir

Re Remediation Action Plan (RAP)
Proposed Car Park, North Street Penrith

This report presents a Remediation Action Plan for the proposed car park to be constructed at North Street Penrith

Should you have any queries, please contact the undersigned.

Yours faithfully
GeoEnviro Consultancy Pty Ltd



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Director

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1 INTRODUCTION

This Remediation Action and Environmental Management Plan (RAP/EMP) is prepared for the asbestos impacted material encountered on Penrith Council's land (ie Subject Site) located on the southern side of North Street in Penrith as shown on Drawing No 1.

We understand that the Subject Site is proposed to be developed into a temporary car park and this car park will extend over an area of about 9825m^2 with approximate 325m frontage to North Street and approximately 55m wide.

This RAP/EMP has been prepared with reference to NSW Environmental Protection Authority (EPA) guidelines under the Contaminated Land Management (CLM) Act 1997 and the findings of the following reports;

- *Limited Subsurface Asbestos Investigation – GTEX Report No 7106.01.INSP dated 10th October 2012 (Reference 1)*
- *Pavement Investigation and Fill Contamination Assessment – Proposed Car Park North Street Penrith - GeoEnviro Consultancy Pty Ltd Referenced JC17302A-r1 dated 31st August 2017. (Reference 2)*
- *Additional Contamination (Asbestos) Assessment and RAP - Proposed Car Park North Street Penrith - GeoEnviro Consultancy Pty Ltd Referenced JC17302A-r1(rev) dated January 2018. (Reference 3)*

2 SITE INFORMATION

2.1 Site Locality and Geology

The site is situated on the southern side of North Street in Penrith and consists of 12 residential lots (ie Lots 2, 4 to 10 and 12 to 15) as shown on the attached Drawing No 1.

The site is situated on low lying gently undulating terrain with ground surface sloping down in a general direction to the south at angles of less than 3 degrees.

The 1:100,000 Soil Landscape Map indicates the site to consist of Residual soil belonging to the Blacktown soil landscape. The soil is typically shallow to moderately deep hardsetting mottled texture contrast soils. Typical characteristics of this soil are moderate reactivity, highly plastic subsoil, low fertility and poor soil drainage.

Based on the 1:100,000 Geological Map of Penrith, the site is underlain by Bringelly Shale (Rwb) of the Wianamatta Group comprising of shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff.

2.2 Site History Review

From our historical review the Subject Site consisted of residential lots with houses fronting North Street with setback distances ranging from 6m to 12m from the footpath. The 2002 aerial photograph revealed three residential dwellings to be present on Lots 2, 4 and 12 and the remaining lots consisted of vacant lots with some trees. Remnants of building footprints were evident on some lots.

In 2013, the two houses on Lots 2 and 4 were removed and the house on Lot 12 remained. The remaining portion of the Subject Site consisted of vacant land with no obvious signs of use.

By 2015, the house on Lot 12 was removed and the entire Subject Site was vacant. There was no significant change in the tree lines since 2002 and the site remained vacant with no specific landuse.

The immediate adjoining properties to the south consist of light industrial and commercial buildings fronting Henry Street.

There were no obvious signs of the Subject Site being used for service station, industrial activities, manufacturing or other activities that may pose a high risk of chemical contamination.

2.3 Previous Environmental Reports

GETEX Report

An asbestos investigation was undertaken by GETEX in 2012 (Reference 1) and involved excavation of 33 test pits across the Subject Site and laboratory analysis to confirm presence of asbestos. Extracts of the GETEX report are attached in Appendix A.

The report concluded the following;

> *The limited subsurface asbestos investigation identified asbestos containing materials in the form of asbestos cement debris within or surrounding twelve (12) of the thirty-three (33) excavated test pits. The majority of asbestos cement debris were identified on the upper ground surface beneath trees or exposed areas of soil where they may have been brought to the surface by the movement of soil.*

The traces of building and demolition debris within the subsurface soil at the central and western sections of site indicates historical demolitions of building structures that contained asbestos cement sheeting. It is the opinion of the consultant that the subsurface soil east of and including Test Pits 22, 23 and 28 is free of building demolition waste and asbestos containing materials. All other soil locations on the site will have a high potential for building/demolition waste to be present and to contain asbestos. All areas identified of having a high potential for building/demolition waste to be encountered are to be classified as asbestos contaminated soil and is to be managed under an Asbestos Management Plan.

GeoEnviro Reports

The site was the subject of a fill contamination assessment undertaken by GeoEnviro in August 2017 (Reference 2) to confirm the presence of asbestos identified by GETEX and this was carried out in conjunction with the pavement investigation for the proposed car park development. The fill investigation consisted of excavation of 17 test pits (TP 1 to TP 17) using a mini excavator.

Five fibro fragments were taken from the test pits (TP 4, 7, 8, 12 and 15) and sent to Envirolab Services for asbestos analysis. In addition, two soil samples (TP 4 and TP 17) were taken to the laboratory for analysis including Heavy metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), Organochlorine Pesticides (OCP), Polychlorinated biphenyl's (PCB), Total Recoverable Hydrocarbon (TRH), Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAH), Asbestos and TCLP – Heavy metals and PAH. The laboratory test results were assessed against the NSW EPA guidelines for the Public Open Space, HBILs 'C' (ie Site Criteria).

The following is a summary of laboratory test (Refer to Appendix A for details);

- The concentrations of heavy metals in the soil samples were found to be within the Site Criteria.
- The concentrations of OCP in the soil samples were found to be negligible or below laboratory detection limits and therefore within the Site Criteria.

- The concentrations of PCB in the soil samples were found to be negligible or below laboratory detection limits and therefore within the Site Criteria.
- The concentrations of TRH in the soil samples were found to be negligible or below laboratory detection limits and therefore within the Site Criteria.
- The concentrations of BTEX in the soil samples were found to be negligible or below laboratory detection limits and therefore within the Site Criteria.
- The concentrations of PAH in the soil sample from TP 4 were found to be negligible or below laboratory detection limits and therefore within the Site Criteria. Slightly elevated concentrations of PAH were encountered in the soil sample from TP 17 with Total PAH of 31mg/kg, however such a concentration is within the Site Criteria.
- Both soil samples did not encounter asbestos fibre (Fibre Asbestos –FA or Asbestos Fibre – AF). All asbestos fragments (Asbestos Cement Material – ACM) obtained from TP 4, 7, 8, 12 and 15) were found to contain Chrysotile, Amosimte and Crociolite.

An additional test pit investigate was carried out on 17th October 2017 (Reference 3) in order to assess the extent of asbestos impacted topsoil/fill and this involved excavation of an additional 17 test pits (ie TP 18 to 33). Extracts of the report are attached in Appendix B.

2.4 Subsurface Conditions

Reference should be made to the attached Table 1 for a summary of subsurface profiles encountered in the investigations (Appendix B). The following is a summary of the subsurface profiles encountered in the test pits;

- Topsoil and topsoil/fill was encountered in all test pits with thickness typically ranging from 150mm to 500mm. Relatively thick topsoil/fill of about 0.6m to 1.2m was encountered in TP 16, 17, 18, 19. The topsoil and topsoil/fill were found to consist predominantly of Clayey Silt and Gravelly Sandy Silt with varying quantities of building debris such as bricks, concrete, glass, tile and porcelain fragments. Some asbestos fragments were encountered in the topsoil/fill in TP 4, 7, 8, 12, 15, 17, 19, 20, 26, 28, 30, 31 and 32.
- A thin layer of crushed sandstone fill about 200mm thick was encountered in TP 7 and 9 and a layer of clayey fill about 100mm thick was encountered beneath the topsoil/fill in TP 13. Some building debris including concrete, tiles and porcelain fragments were encountered in TP 13.
- Natural medium to high plasticity Silty Clay was encountered beneath the topsoil and fill at depths ranging from 0.3m to 1.2m below existing ground surface. Based on the hand penetrometer test results , the natural clay was assessed to be generally very stiff. The natural clay was generally found to be dry.
- Bedrock was not encountered in any of the test pits which were taken to a maximum depth of 2.0m below existing ground surface.
- All test pits were found to be dry during and shortly after investigation.

3 ASSESSMENT AND PREFERRED REMEDIATION APPROACH

Based on our historical review of the site and the results of previous investigations, the following is a summary of the contamination assessment;

- The risk of gross chemical contamination within the Subject Site is low.
- The site is impacted by ACM (Asbestos) contaminated topsoil/fill. There is no apparent asbestos contamination in the underlying natural clayey soil.

For the proposed car park development, our previous reports highlighted the following geotechnical and contamination issues which need to be considered;

- The topsoil/fill material is not considered to be suitable as subgrade material for the proposed car park from the geotechnical perspective without improvement by mixing with some better quality compactable fill material
- The topsoil/fill material is impacted by ACM (Asbestos) and therefore removal of this material will incur costly landfill tip fees.
- Mixing and blending of the topsoil/fill with good quality fill to improve subgrade properties for the proposed car park will results in contaminating good quality fill with asbestos and therefore lead to higher clean up cost in future.
- Filling directly over the topsoil/fill with good quality subgrade material to improve subgrade characteristics and regrade the site for the car park will result in potential difficulty in separating the good fill from the underlying asbestos contaminated topsoil/fill should the site be redeveloped in future.

Based on the foregoing, the preferred remediation approach is for the asbestos impacted topsoil/fill material to be managed on site by isolation and encapsulation within Council's designated area on Lots 2, 4 and 5 as shown Drawing No 2.

The amount of asbestos impacted topsoil/fill and topsoil is difficult to quantify as there is no apparent trend in the location of ACM encountered in the test pits. From on the test pits, it may be assumed that the average thickness of topsoil/fill across the site is about 0.4m and based on a site area of about 9825m^2, the estimated total volume of topsoil/fill is about 4000m^3.

On the basis that about 40% of the test pits (ie 13 out of 35 test pits) were found to have asbestos, a rough estimate of about 1500 to 2000m^3 of topsoil/fill may be impacted by asbestos. We note that final volume of asbestos impacted soil could only be determined during remediation works when all topsoil/fill is excavated and the site is fully exposed.

4 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources and exposure parthways between those sources and receptors. The model provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present ofr the future and it enables an assessment of the potential pathways.

4.1 Identified Contamination

Based on the findings of the previous investigations, the potential contamination on site is as defined in Table A below;

Table A: Potential Areas of Environmental Concerns

Potential Source	**Contaminant Type**	**Issues**
Topsoil/fill	Bonded asbestos containing material (ACM)	Friability of contaminants
Topsoil/fill	Potential asbestos fines/fibrous asbestos (AF/FA)	Airborne asbestos

4.2 Potential Receptors

The following potential human receptors have been identified for the site;

- Construction and maintenance workers during construction site redevelopment.
- Future site uses following development of the site with the most sensitive receptor being a child.
- Land users in adjacent areas (commercial/retail to the south).

4.3 Potential Pathways

Potential pathways for contamination include the following;

- Break down of ACM to become asbestos fines
- Inhalation of airborne fibres and dust.

5 REMEDIATION ACTION PLAN

The following sections describe the components essential for the remediation of the site. Appropriate modification of these components may be required depending upon actual site conditions encountered during the remediation process and other factors involving the logistics of the work to be carried out.

It is the contractor's responsibility to devise a safe work method statement and to implement proper controls that enable the personnel undertaking the remediation to work in a safe environment. This RAP does not relieve the contractors of their ultimate responsibility for occupation health and safety of their workforce and to prevent contamination of areas outside the immediate workspace. This RAP sets out the minimum standards and guidelines for remediation that will need to be used in preparing a method statement.

Remediation works must be undertaken by an appropriate licensed asbestos remediation contractor and in accordance with Work Health and Safety Regulation NSW 2011 and other applicable WorkCover NSW or Safe Work Australia regulations or guidelines.

Should AF/FA be discovered during the course of the remediation, we recommend remediation of AF/FA impacted soils to be undertaken by Class A asbestos licensed contractor and written notice to WorkCover NSW be issued at least five days before remediation work commences.

5.1 Remediation Goals

The remediation goal is to remediate the asbestos impacted topsoil and topsoil/fill in order to ensure suitability of the site for the proposed car park and future redevelopment.

5.2 Remediation Criteria

The NEPM 2013 guidelines should be adopted as the remediation criteria to clean up the site. The criteria as follows;

- Bonded ACM : 0.01% w/w of asbestos in soil with bonded ACM generally comprising of 15% asbestos
- Fibrous asbestos and Asbestos Fines: 0.001% w/w FA and AF
- No visible asbestos on the ground surface

5.3 Remediation Strategy and Process

The remediation strategy is as follows;'

- Excavation of all topsoil/fill from the site to expose the underlying natural clean clay noting that the insitu topsoil/fill is generally considered not suitable for reuse without treatment or improvement from a geotechnical perspective. Prior to excavation, the grass and vegetation should be stripped from the surface and the exposed area should be noted for concentration of asbestos.
- Areas with high asbestos ACM concentration if identifiable should be delineated and excavated at increment depth of 150mm and the excavated surface be reassessed for presence of asbestos until the all topsoil/fill is removed. Care should be taken during excavation to isolate clean topsoil/fill from contaminated topsoil/fill. The high ACM impacted topsoil/fill should be disposed off site to a NSW approved landfill as "Special Waste – Asbestos".
- The excavated topsoil/fill with no visible ACM should be stockpiled neatly in 15 to 20m^3 stockpiles and each stockpile should be identified and labelled for assessment.
- The base should be inspected by environmental consultant to ensure adequate removal of asbestos impacted material and some validation testing by sampling and laboratory analysis may be carried out.
- The stockpiles should be sampled and assessed for presence of asbestos in accordance to the NEPM 2013 procedure (Reference 8). The NEPM provides a guideline on health screening levels for asbestos in soil which may be classified in three types of asbestos; Bonded asbestos-containing-material (ACM), Fibrous asbestos (FA) and Asbestos fines (AF).

  This procedure includes;

  - Bulk sampling of representative stockpile samples and sieving the samples through 7mm aperture sieve.
  - Measuring the weight of retained asbestos fragments classified as Asbestos Cement Material (ACM),
  - Analysing the sieved samples for Asbestos Fibre (AF) and Fibre Asbestos (FA) material by Envirolab Services
  - Comparing the results with the NEPM 2013 acceptable threshold levels

- The remediation approach for the stockpiles is as follows;
    - If AF/FA is recorded, the stockpile shall be disposed off site to a NSW approved landfill as "Special Waste – Asbestos".
    - If ACM is recorded but no AF/FA recorded, the stockpile shall be placed and contained within the encapsulation cell as shown on Drawing No 2.
    - If no AF/FA or ACM is recorded, the material is suitable for retention as part of the development with no restrictions.

- Nominate a suitable location for the encapsulation cell. The preferred area (on Lots 2, 4 and 5) nominated by Council is as shown on Drawing No 1 and the proposed depth of cell is 2.5m deep to allow for 1m of capping. Depending on the final volume of ACM impacted material, the extent of the area will be adjusted accordingly to accommodate the volume.

  A layer of geofabric (eg Bidim A34) in accordance to the "Guidelines for the Assessment, Remediation and Management of Australia" (Reference 11) should be placed on top of the cell in order to enable future identification and this should be surveyed and documented. A capping material consisting of clean and validated fill (Virgin Excavated Natural Material – VENM) should be placed on top of the cell to design level of the proposed car park.
  The cell location and depth should be surveyed and documented for future reference. Some battering of the cell walls up to 45 degrees would be required for safety.

- The topsoil/fill material suitable for retention on site may be reuse as general fill subject to further assessment by a geotechnical engineer. Topsoil/fill improvement may include mixing of this material with good quality fill such as ripped sandstone based on an initial mix proportion of 1 topsoil/fill to 2 ripped sandstone. The final mix proportion should be determined by the geotechnical engineer.

- All fill material (ie cell material, capping material and general fill) should be placed in layers not exceeding 250mm thickness and compacted to a minimum 95% Standard Maximum Dry Density (SMDD) at within 2% Optimum Moisture Content (OMC).

- The surface should be covered with pavement or vegetated to control erosion and scouring of barrier which may eventually lead to exposure of asbestos fragments.

6 VALIDATION PLAN

6.1 Excavation Area

All excavation areas from the asbestos remediation process should be adequately validated in order to ensure the area is adequately cleaned of contaminated soil. Validation of the excavated areas should include;

- Visual inspection for signs of anthropogenic material including ACM and building demolition rubbish/waste. The visual inspection will be conducted on a 2m grid.
- The results of the visual inspection will be confirmed through soil sampling if considered necessary. Validation sampling to be collected at regular spatial intervals of one every 20m apart and 1m depth intervals for laboratory analysis.
- Should asbestos contamination be encountered during validation of the excavated areas, further remediation works should be carried out.
- The validation laboratory test results should be compared with the appropriate acceptance criteria as outlined in Section 5.2 of this RAP.

6.2 Imported Fill Material

All imported fill materials if required should be assessed for their suitability for use at the Site. Only VENM (or if permitted by the local council – ENM) materials should be imported. Material shall only be considered suitable for use on-site if the following criteria (minimum) are satisfied:

- The material should be defined as VEMN based on NSW EPA 2014. The assessment should be undertaken in accordance with the NSW EPA 2014 Guidelines. One validation sample per 1000m^3 of earth fill or a minimum of 3 samples should generally be adequate depending on the homogeneity of the fill material. More samples per unit volume of earthfill may be required if the fill material is found to be variable.
- The material source site should be assessed by an experienced consultant for suitability.
- The concentrations of metals are within the accepted background concentrations.
- The other selected analytes (ie. TPH, BTEX, PAH, OCP, asbestos) are all less than the laboratory limit of reporting (LOR).
- The composition, type and colour of the material should be generally consistent with the local geology.
- Imported material should be assessed for its aesthetic suitability to the site.
- Imported material should not affect the surrounding ecosystem or sensitive environmental receptors.

The supervising environmental consultant should perform routine inspections of the VENM upon arrival to site. The consultant should inspect the material to ensure it is consistent with the material characteristic/ descriptions provided in its respective source VENM report. Should any unexpected find, uncharacteristic material or visible/ olfactory contamination be observed in the VENM the load should be rejected from import to site.

We recommend the supervising consultant consider use of a *'Fill Import, Load Inspection Proforma'* which can be completed during the import works to verify each load of imported material

6.3 Final Validation Report

The validation plan should be prepared by an experienced consultant. The report should be prepared in general accordance with the *NSW OEH 2011 Guidelines for Consultants Reporting on Contaminated Sites.* The report should comprehensively address:

- Historical investigations undertaken at the site
- Detail the remediation works undertaken at the site
- Present field and laboratory information satisfying the objectives of the RAP
- Demonstrate that the remediation outcomes have been achieved
- Include all waste tracking and disposal information, both for all exported wastes and all imported products.
- Detail any unexpected finds or pollution incidents which may have occurred during the works.
- Outline any variance from the remedial strategy and discuss how this was appropriately implemented.
- Outline any long-term environmental management or monitoring requirements for the site
- Include any other information relevant to the contamination status of the site
- Provide a statement regarding the future suitability of land for its intended use from a contamination perspective

7 QUALITY ASSURANCE PLAN

Appropriate quality assurance/quality control (QA/QC) procedures should be maintained during the course of validation sampling. The samples should be analysed at a National Associate of Testing Authority (NATA) accredited laboratory. The QA/QC procedures and results adopted should be included in the final validation report.

8 UNEXPECTED FINDS PROTOCOL

Whilst undertaking remediation and civil works, should any site specific geologically-uncharacteristic material be observed that was not identified during earlier site investigations the following precautions and actions should be implemented:

- Works in the vicinity of the material are to cease immediately
- The area is to be sign posted and cordoned off from other site workers
- Advise the local government authority (council) of the discovery – to the assigned principal compliance officer (PCA).
- Engage a suitably qualified consultant to attend site to assess the materials
- Photographic records should be collected
- Do not disturb any suspected contaminated material until further observation and determination of the material (should it be hazardous) has been be undertaken by an experienced consultant.
- PPE should be used (if required).
- Environmental Sampling, removal, off-site disposal and validation
- The engaged EPA accredited environmental site auditor should be kept informed of un-expected occurrences and consulted with if required.

Uncharacteristic soil may be characterised as:

- Include former rifle range equipment, consumables, pellets, bullet housings, skeet targets etc.
- Distinctively different to other soils on-site
- Appear to be concentrated to a localised area (ie. burial pits)
- Stained, oil soaked or containing a petroleum sheen. Includes other products such as batteries etc

- May contain offensive odours, including sulphur based leachate impacts or sewerage
- Buried building products and debris/ waste or other anthropogenic materials
- May contain potential asbestos containing materials. In the event where bonded asbestos fragments are encountered on the site other those areas identified, an unexpected asbestos finds protocol as detailed in Appendix C should be initiated.
- May contain buried animal carcasses or evidence of decomposition

9 SITE MANAGEMENT PLAN

It is the responsibility of the Contractor to develop a Site Management Plan (SMP) detailing overall site management, environmental management (including soil, air and water) and work health and safety (WHS) plans. This section provides a brief summary of some of the items which need to be included in the Contractor's plans.

Works shall comply with all legislative requirements including but not limited to those set out under the following Acts (and subsequent amendments and regulations);

- Environmentally Hazardous Chemicals Act (1985)
- Hazardous Chemicals Act (1985) (under review)
- Environmental Offences and Penalties Act (1989)
- Agricultural and Veterinary Chemicals Act (1994)
- Protection of the Environmental Operations Act (POEO) (1997) and associated exclusions;
- Pesticide Act (1999)
- OHS Amendment (Dangerous Goods) Act 2003 including OHS Amendment (Dangerous Goods Regulation 2005) and
- POEO Amendment Act 2005 (including POEO Amendment (Scheduled Activities and Waste) Regulation 2008).

9.1 Site Operations

The schedule of remedial works, including timing and staging is to be prepared by the Contractor to meet the requirement of this RAP.

Remediation works will be restricted to the hours set out by Council.

It is the site owner/developers responsibilities to ensure that appropriate personnel are appointed to manage and conduct the remediation and validation works. This will include;

- The Principal's representative who is responsible for overseeing the implementation of this RAP
- The asbestos licensed Contractor, who is responsible for overseeing the implementation of this RAP, conducting the remediation works and managing the site and

- An environmental consultant who will be responsible for providing advice as required for the remedial works and undertaking the validation works in accordance with this RAP.

Other parties who may be employed to assist in the implementation of this RAP include but not limited to Occupational Hygienist and Asbestos Licensed Contractor.

The Contractor will be responsible for preparing a list of contacts for the works, including emergency contacts for the site operations and provision of signage at the site to allow the public to contact nominated site personnel out of hours.

9.2 Environmental Management Plan

Generally, an approved EMP should be prepared for implementation during site works. The requirements of the EMP may include the following measures (but are not limited to):

- Measures to control noise emissions
- Measures to suppress odours and dust emissions
- Measures to monitor and control airborne asbestos.
- Selection of traffic routes to minimise residential noise intrusions
- Soil and sediment controls to prevent erosion/ run-off
- Measures to identify hazardous and industrial wastes and procedures for removal including asbestos
- Community consultation

Further:

- The development shall not result in increased sediment deposition to water bodies, wetlands, bushlands or environmentally significant lands.
- All disturbed areas shall be progressively stabilised and re-vegetated so no area remains exposed for extended periods.
- Sediment and erosion measures should be maintained until establishment of ground cover
- Vehicular access shall be controlled through installation of wash bays or shaker ramps to prevent tracking of sediment or dirt onto adjoining roadways. Wet washing of roadways to remove sediment is not permitted – another means must be implemented.

- All topsoil, aggregate, sand or spoil shall be stored clear of drainage lines, easements, water bodies, stormwater drains, footpaths, kerbs, roads and there shall be measures in place with the approved sediment and erosion control plan.
- The remediation works shall comply with the *NSW EPA Interim Construction Noise Guideline* for the control of noise from construction sites. No works shall occur outside the allowed hours as specified. It is preferable all noisy activities are focused in the mid-morning or mid-afternoon when most neighbours may not be at home.
- Any litter and refuse on-site should be immediately collected and placed in bins with plastic liners for disposal offsite in the general waste bins. Any outdoor bins should have secured lids to prevent birdlife picking items and dispersing rubbish across site.
- Good civil work practises and overall housekeeping should be maintained on-site, potential run-off from excavations and stockpiles should be appropriately protected using control measures such as hay bales and silt fencing.
- The project design and environmental protection measures should also consider the requirements specified in Landcom 2004 'The Blue Book Managing Urban Stormwater

9.3 Traffic Control and Management Plans

Generally, a Construction Traffic Management Plan is required for development works. The plan should detail:

- Vehicle route
- Number of trucks
- Hours of operation
- Access arrangements
- Traffic control

The plan is to be submitted to council for approval and in some cases the RMS. The plans should be prepared in accordance with the *NSW RMS Traffic Control at Work Sites V4.*

9.4 Dust and Odour Management

Given the sensitive location and general nature of remediation it is crucial adequate dust control measures are implemented during the remediation works. Dust shall be managed using techniques that may include (but not be limited to):

- Utilising a water cart to control dust on all exposed areas of site.
- Wetting down material prior to loading or handling
- Covering, grassing or stabilising exposed earth stockpiles that will be left for an extended period of time

It is overall good practice to prevent the generation of any nuisance dust during the works. Due to the nature of the contaminants and site conditions, odour is unlikely to be an issue at the site.

9.5 Airborne Asbestos Control and Management

Regular air sampling and monitoring should eb undertaken during and after completion of the site remediation works. In the event where a significant amount of friable asbestos (AF/FA) is uncovered during remediation works, daily air monitoring of airborne asbestos fibres should be undertaken.

The levels of airborne asbestos fibres should be analysed using the Standard Polarised Light Microscopy Method. The airborne asbestos fibre level of 0.1 fibre/ml is adopted as the occupational exposure standard.

Exceedance of this level will trigger the requirements for;

- The engagement of a Class A asbestos licensed remediation contractor and an Occupation Hygenist
- A review of remediation work methodology to limit generation of airborne asbestos.
- Additional PPE requirements including P2 disposal dusk mask or a particulate half-face mask with a P3 filter and disposal coveralls.
- Establishment of decontamination facilities.

10 CONCLUSION

Subject to site remediation as outlined in the Remediation Action Plan (RAP), the site will be suitable for the proposed future development.

11 LIMITATIONS

The findings contained in this report are the results of discreet/specific sampling methodologies used in accordance with normal practices and standards. There is no investigation which is thorough enough to preclude the presence of material which presently, or in future, may be considered hazardous to the site. The site has been the subject of dumping of rubbish fill in the past and the scope of this report do not cover for future dumping and burial of such material on the subject site.

As regulatory evaluation criteria are constantly updated, concentrations of contaminants presently considered low, may in the future fall short of regulatory standards that require further investigation/redemption.

The statements presented in these documents are intended to advise you of what should be your realistic expectations of this report, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by GeoEnviro Consultancy Pty Ltd, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

Attached in Appendix D are documents entitled “Important Information about Your Environmental Site Assessment” and Explanatory Notes in conjunction with which this report must be read, as it details important limitations regarding the investigation undertaken and this report.

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REFERENCES

1. *Limited Subsurface Asbestos Investigation – GTEX Report No 7106.01.INSP dated 10th October 2012*
2. *Pavement Investigation and Fill Contamination Assessment – Proposed Car Park North Street Penrith - GeoEnviro Consultancy Pty Ltd Referenced JC17302A-r1 dated 31st August 2017.*
3. *Additional Contamination (Asbestos) Assessment and RAP - Proposed Car Park North Street Penrith - GeoEnviro Consultancy Pty Ltd Referenced JC17302A-r1(rev) dated January 2018.*
4. *1:100,000 Geological Map of Penrith – Geological Series Sheet 9029-9129 (Edition 1) 1985*
5. *1:100,000 Soil Landscape Map of Penrith – Soil Conservation Service of NSW; Sheet 9029-9129*
6. *Health Based Soil Investigation Levels, National Environmental Health Forum Monographs Soil Series No. 1 – 1996*
7. *Assessment of Site Contamination- Measure 1999 – National Environment Protection*
8. *National Environment Protection (Assessment of Site Contamination) Measure 1999 (including updated Schedule B1 – 2013)*
9. *Guidelines for the NSW Auditor Scheme (2nd Edition), NSW EPA 2006*
10. *NSW EPA 2014 guidelines "Part 1 – Classifying Waste*
11. *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia – Department of Heath -May 2009*
12. *SafeWork NSW; multiple publications*
13. *Work Health and Safety Regulation, NSW Government, 1 July 2011*

Legend

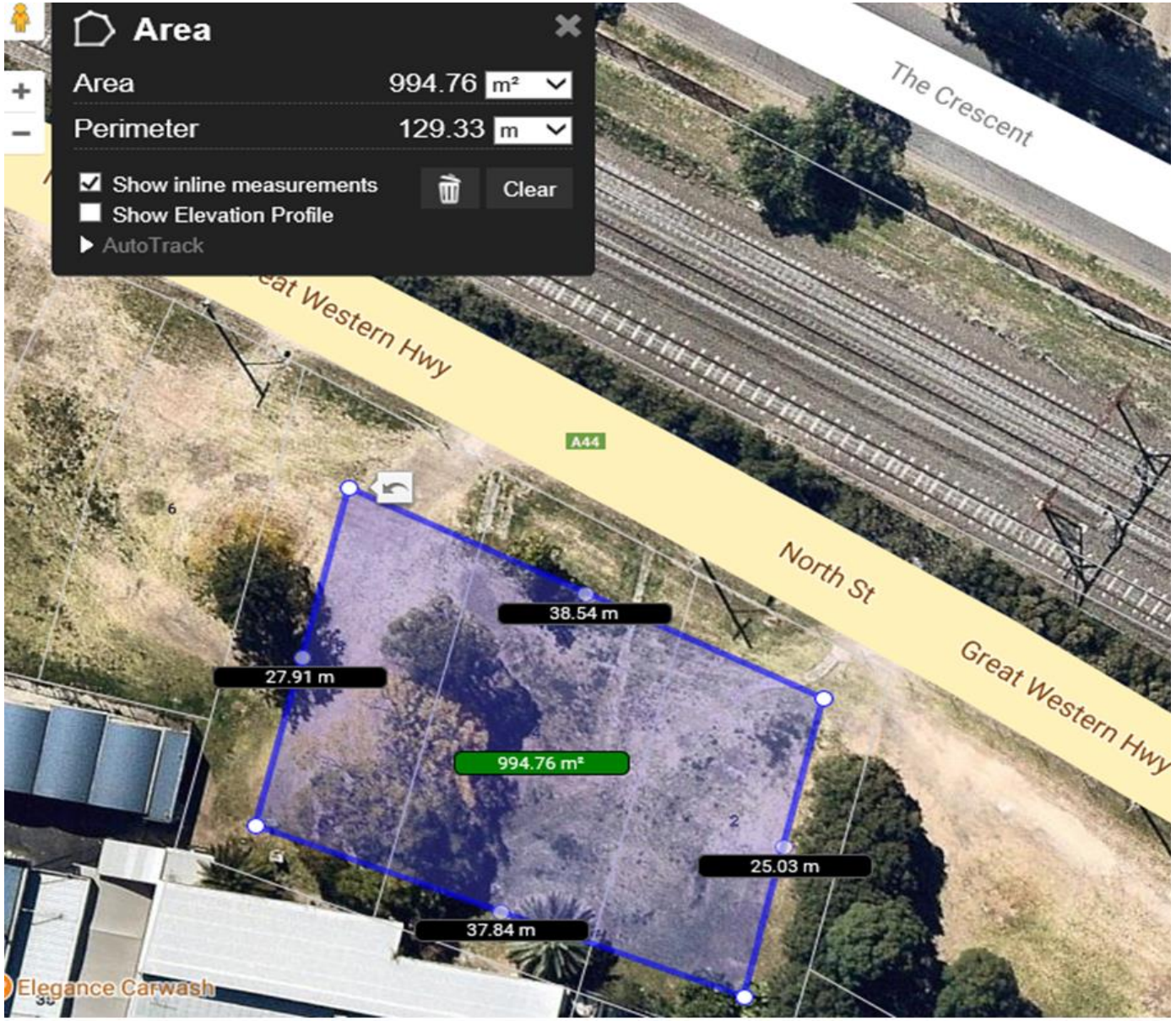
Test Pit

GeoEnviro Consultancy

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia

Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT	Date: 10/5/18	Penrith City Council North Street Penrith Site Locality	
Checked By: SL	Date: 10/5/18		
Revision By:	Date:		
Scale: Not to Scale	A3	Project No: JC17302A	Drawing No: 1



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GeoEnviro Consultancy Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia Tel: (02) 96798733 Fax: (02) 96798744	Drawn By: AT	Date: 10/5/18	**Penrith City Council** **North Street Penrith** **Proposed Encapsultation Cell Location**
	Checked By: SL	Date: 10/5/18	
	Revision By:	Date:	
	Scale: Not to Scale	A3	**Project No: JC17302A** / **Drawing No: 2**

APPENDIX A

Extracts of Limited Subsurface Asbestos Investigation – GTEX Report
No 7106.01.INSP dated 10th October 2012

LIMITED SUBSURFACE ASBESTOS INVESTIGATION

Report Number: **7106.01.INSP**
Report Date: **10 October 2012**

1. CLIENT DETAILS

Client Company: Penrith City Council
Client Contact: Graham Howe
Client Address: PO Box 60
PENRITH NSW 2751

2. SITE DETAILS

Site Address: Penrith Council Site
Corner of Henry and North Street (Bound by Evan Street)
PENRITH NSW 2750

3. BACKGROUND

A limited subsurface asbestos investigation of eight (8) test pits and the collection of two (2) samples for the analysis of asbestos content was undertaken by Getex on the 17th of September 2012 at 2-3 North Street PENRITH NSW 2750. Asbestos containing materials were identified in all 8 of the test pits and the results of the investigation are presented in Getex Report 7080.01.INSP.

Getex were then engaged by Penrith City Council to undertake a limited below ground asbestos investigation in order to determine the presence of asbestos containing materials within the subsurface soil in an extended area between Henry and North Street, bound by Evan Street to the west. Refer to Appendix II for the location of the Site.

For the purposes of this report, the Investigation Area as identified in Appendix II is called the Penrith Council Site.

4. SCOPE

Getex Pty Ltd (Getex) was requested by Graham Howe of Penrith City Council to attend the site on the corner of Henry and North Street (Bound by Evan Street to the west) PENRITH NSW 2750 and conduct a limited subsurface asbestos investigation. The limited subsurface asbestos investigation involved visually identifying any occurrences of asbestos containing material (ACM) being present at subsurface levels on site. A total of thirty-three (33) test pits were excavated to a maximum depth of one (1) metre.

5. METHOD

An excavator provided by ARCS Building Group Pty Ltd (ARCS) was utilised to excavate test pits at thirty-three (33) locations within the Penrith Council Site. The test pit locations were nominated by Paul Paciullo of Getex. The test pits and surface soils were visually inspected for the presence of possible asbestos containing materials. In the event that ACM were identified, Getex were to note the extent of contamination within each of the respective test pits. Test Pits were excavated up to a maximum depth of 1 metre. Thirty samples (23 soil and 7 fragment samples) were collected and analysed for asbestos content to support the visual inspection results.

Note: It was not intended that any potential asbestos containing materials be removed from site on the day of the subsurface asbestos investigation. All excavated test pits were backfilled by ARCS following the subsurface asbestos investigation.

6. INSPECTION DETAILS

Test Pit 1: The Horizon A layer is 0.2 metres deep and light brown in colour. The Horizon B layer is +0.2 metres deep and consists of red clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 1.

One soil sample (7025/TP01) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 2: The Horizon A layer is 0.3 metres deep and light brown in colour. The Horizon B layer is +0.3 metres deep and consists of red clay.

Minor occurrences of asbestos containing materials were noted on the ground surface to the west and south-west of Test Pit 2 at a distance of 15 metres.

No signs of visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 2.

One soil sample (7025/TP02) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 3: The Horizon A layer is 0.2 metres deep and dark brown in colour, containing fragments of broken glass. The Horizon B layer is +0.2 metres deep and consists of red clay.

Minor occurrences of asbestos containing materials were noted on the ground surface surrounding the Test Pit to a distance of between 0-10 metres.

No signs of visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 3.

One fragment of cement sheeting debris (7025/TP03) was collected from the soil ground surface 1 metre east of the Test Pit. The analysis result confirmed the presence of **Chrysotile and Amosite Asbestos** within the sample.

Test Pit 4: The Horizon A layer is 0.2 metres deep and dark brown in colour, containing fragments of Asbestos Cement Debris. The Horizon B layer is +0.2 metres deep and consists of red clay.

Minor occurrences of asbestos containing materials were noted on the ground surface to the east of the Test Pit to a distance of between 10 -15 metres.

No signs of visually identifiable asbestos containing materials were noted on the edges or at the base of Test Pit 4.

One fragment of cement sheeting debris (7025/TP04) was collected from the Horizon A layer. The analysis result confirmed the presence of **Chrysotile Asbestos** within the sample.

Test Pit 5: The Horizon A layer is 0.2 metres deep and consists of light brown sand. The Horizon B layer is 0.2 to 0.6 metres deep and consists of dark brown clay loam. The Horizon C layer is +0.6 metres deep and consists of red clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 5.

One soil sample (7025/TP05) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 6: The Horizon A layer is 0.2 metres deep and consists of light grey gravel. The Horizon B soil layer is between 0.2 and 0.5 metres deep and consists of brown clay and gravel. The Horizon C layer is +0.5 metres deep and consists of red clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 6.

One soil sample (7025/TP06) was collected from the Horizon B layer. No asbestos was detected within the sample.

Test Pit 7: The Horizon A layer is 0.1 metres deep and consists of light grey gravel. The Horizon B soil layer is between 0.1 and 0.5 metres deep and consists of dark

clay loam with fragments of bricks, tiles and dark ash/organics. The Horizon C layer is +0.5 metres deep and consists of red clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 7.

One soil sample (7025/TP07) was collected from the Horizon B layer. No asbestos was detected within the sample.

Test Pit 8: The Horizon A layer is 0.2 metres deep and consists of brown gravel and road base. The Horizon B soil layer is between +0.2 metres deep and consists of orange/brown clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 8.

Three minor fragments of asbestos containing debris were visually identified on the ground surface approximately 2 metres north-east of the test pit.

One fragment of cement sheeting debris (7025/TP08) was collected from the ground surface 2 metres north east of the test pit. **Chrysotile, Amosite and Crocidolite asbestos was detected** within the sample.

Test Pit 9: The Horizon A layer is +1 metre deep and consists of dark brown clay loam.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 9.

One soil sample (7025/TP09) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 10: The Horizon A layer is 0.2 metres deep and consists of fine lightly brown coloured river sand. The Horizon B soil layer is between 0.2 and 0.8 metres deep and consists of dark brown clay loam with ceramic and asbestos cement fragments within. The Horizon C layer is +0.8 metres deep and consists of red clay.

Fragments of asbestos containing materials were noted within the excavated material from the Horizon B soil layer of Test Pit 10.

One fragment of cement sheeting debris (7025/TP010) was collected from the excavated Horizon B soil layer. **Chrysotile and Amosite asbestos was detected** within the sample.

Test Pit 11: The Horizon A layer is 0.4 metres deep and consists of dark brown clay loam with pantyhose, plastic cups, fragments of ceramic and glass material and bricks. The Horizon C layer is +0.4 metres deep and consists of orange clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 11.

Minor fragments of asbestos containing debris were noted on the ground surface at the base of the tree to the east of the test pit.

One soil sample (7025/TP11) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 12: The Horizon A layer is 0.3 metres deep and consists of dark brown clay loam mixed with fragments of glass and ceramics. The Horizon B layer of soil within the test pit was +0.3 metre deep and consists of light brown clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 12.

One soil sample (7025/TP12) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 13: The Horizon A layer is 0.3 metres deep and consists of dark brown clay loam mixed with fragments of glass and ceramics. The Horizon B layer was +0.3 metres deep and consists of orange/brown clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 13.

One soil sample (7025/TP13) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 14: The Horizon A layer is 0.4 metres deep and consists of dark brown clay loam mixed with fragments of glass, ceramics, bricks, terracotta pipes and tiles. The Horizon A layer also contained ash/dark soft organic material. The Horizon B layer is +0.4 metres deep and consists of light orange/brown clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 14.

One soil sample (7025/TP14) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 15: The Horizon A layer is 0.6 metres deep and consisted of dark brown clay loam mixed with ceramic fragments. The Horizon B layer is +0.6 metres deep and consists of light orange/brown clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 15.

Minor fragments of asbestos containing cement debris were noted on the ground surface at the base of the tree to the east of the test pit.

One soil sample (7025/TP15) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 16: The Horizon A layer is +1 metre deep and consists of dark brown clay loam.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 16.

One soil sample (7025/TP16) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 17: The Horizon A layer is 0.3 metres deep and consists of dark brown clay loam. The Horizon B layer is +0.3 metres deep and consists of light orange/brown clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 17.

One soil sample (7025/TP17) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 18: The Horizon A layer is 0.3 metres deep and consists of dark brown clay loam. The Horizon B layer is +0.3 metres deep and consists of light orange/brown clay.

Fragments of asbestos containing materials were noted within the excavated material from the Horizon A soil layer of Test Pit 18.

One soil sample (7025/TP18) was collected from the Horizon A layer. Fragments of cement sheeting containing **Chrysotile asbestos** were detected within the sample.

Test Pit 19: The Horizon A layer is 0.1 metres deep and consists of dark brown clay loam. The Horizon B layer is 0.1-0.25 metres deep and consists of light brown clay loam. The Horizon C layer is +0.25 metres deep and consists of light orange/brown clay.

Fragments of asbestos containing materials were noted within the excavated material from the Horizon A soil layer of Test Pit 19.

One fragment of cement sheeting debris (7025/TP019) was collected from the excavated Horizon A soil layer. **Chrysotile Amosite and Crocidolite asbestos was detected** within the sample.

Test Pit 20: The Horizon A layer is 0.3 metres deep and consists of light brown clay loam. The Horizon B layer is +0.3 metres deep and consists of light brown clay.

Fragments of asbestos containing materials were noted within the excavated material from the Horizon A soil layer of Test Pit 20.

One fragment of cement sheeting debris (7025/TP020) was collected from the excavated Horizon A soil layer. **Chrysotile asbestos was detected** within the sample.

Test Pit 21: The Horizon A layer is 0.3 metres deep and consists of light brown clay loam. The Horizon B layer is +0.3 metres deep and consists of dark brown clay loam.

Fragments of asbestos containing materials were noted within the excavated material from the Horizon B soil layer of Test Pit 21.

One fragment of cement sheeting debris (7025/TP021) was collected from the excavated Horizon B soil layer. **Chrysotile and Amosite asbestos was detected** within the sample.

Test Pit 22: The Horizon A layer is 0.1 metres deep and consists of clay loam. The Horizon B layer is 0.1-0.3 metres deep and consists of orange/brown clay. The Horizon C layer is +0.3 metres deep and consists of slate.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 22.

One soil sample (7025/TP22) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 23: The Horizon O layer is 0.3 metres deep and consists of organic mulch. The Horizon A layer is +0.3 metres deep and consists of dark brown clay loam mixed with fragments of bitumen.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 23.

One soil sample (7025/TP23) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 24: The Horizon O layer is 0.2 metres deep and consists of organic mulch. The Horizon A layer is +0.2 metres deep and consists of dark brown clay loam.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 24.

One soil sample (7025/TP24) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 25: The Horizon A layer is 0.1 metres deep and consists of dark brown clay loam. The Horizon B layer is 0.1-0.25 metres deep and consists of orange clay. The Horizon C layer is +0.25 metres deep and consists of hard clay and rock.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 25.

One soil sample (7025/TP25) was collected from the Horizon B layer. No asbestos was detected within the sample.

Test Pit 26: The Horizon A layer is +1 metre deep and consists of light brown/grey clay loam mixed with asphalt and brick debris.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 26.

One soil sample (7025/TP26) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 27: The Horizon A layer is 0.6 metres deep and consists of light brown/grey clay loam. The Horizon B layer is +0.6 metres deep and consists of clay and rocks.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 27.

One soil sample (7025/TP27) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 28: The Horizon A layer is 0.1 metres deep and consists of light brown loam. The Horizon B layer is +0.1 metres deep and consists of bright orange clay.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 28.

One soil sample (7025/TP28) was collected from the Horizon A layer. No asbestos was detected within the sample.

Test Pit 29: The Horizon A layer is 0.2 metres deep and consists of light brown loam. The Horizon B layer is +0.2 metres deep and consists of dark brown loam mixed with minor fragments of steel, ceramics and string.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 29.

One soil sample (7025/TP29) was collected from the Horizon B layer. No asbestos was detected within the sample.

Test Pit 30: The Horizon A layer is 0.6 metres deep and consists of light brown clay loam. The Horizon B layer is +0.2 metres deep and consists of dark brown loam mixed with smooth round pebbles approximately 100mm in diameter.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 30 .

One soil sample (7025/TP30) was collected from the Horizon B layer. No asbestos was detected within the sample.

Test Pit 31: The Horizon A layer is +1 metre deep and consists of dark brown clay loam mixed with significant amounts of building waste (steel, brick ceramics terracotta and asbestos cement sheeting debris)

Fragments of asbestos containing materials were noted within the excavated material from within Horizon A soil layer of Test Pit 31.

Test Pit 32: The Horizon A layer is +1 metre deep and consists of dark brown clay loam mixed with terracotta and tree roots.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 32.

Test Pit 33: The Horizon A layer is +1 metre deep and consists of dark brown clay loam mixed with tree roots.

No visually identifiable asbestos containing materials were noted on the edges, at the base or within the excavated material of Test Pit 33.

Please refer to Appendix I for Photographs.
Please refer to Appendix II for Site Map.
Please refer to Appendix III for the Asbestos Sample Analysis Report.

Exclusions: Any potentially asbestos containing materials exposed at a time later than the Time of Inspection due to the actions of wind, rain, physical or mechanical disturbance.

Date of Inspection: 4 October 2012
Time of Inspection: 07:00 hrs to 15:00 hrs
Inspected By: Paul Paciullo of GETEX

7. DISCUSSION

The limited subsurface asbestos investigation identified asbestos containing materials in the form of asbestos cement debris within or surrounding twelve (12) of the thirty-three (33) excavated test pits. The majority of asbestos cement debris were identified on the upper ground surface beneath trees or exposed areas of soil where they may have been brought to the surface by the movement of soil.

The traces of building and demolition debris within the subsurface soil at the central and western sections of site indicates historical demolitions of building structures that contained asbestos cement sheeting.

It is the opinion of the consultant that the subsurface soil east of and including Test Pits 22, 23 and 28 is free of building demolition waste and asbestos containing materials. All other soil locations on the site will have a high potential for building/demolition waste to be present and to contain asbestos.

All areas identified of having a high potential for building/demolition waste to be encountered are to be classified as asbestos contaminated soil and is to be managed under an Asbestos Management Plan.

Photograph 1
Test Pit 1

Photograph 2
Test Pit 2

Photograph 3
Asbestos Cement debris adjacent to Test Pit 3

Photograph 4
Test Pit 4

Photograph 5
Test Pit 5

Photograph 6
Test Pit 6

Photograph 7
Test Pit 7

Photograph 8
Test Pit 8

Photograph 9
Asbestos Cement debris adjacent to Test Pit 8

Photograph 10
Test Pit 9

Photograph 11
Test Pit 10

Photograph 12
Test Pit 11

Photograph 13
Test Pit 12

Photograph 16
Asbestos Cement debris adjacent to Test Pit 15

Photograph 14
Test Pit 13

Photograph 17
Test Pit 15

Photograph 15
Test Pit 14

Photograph 18
Test Pit 16

Photograph 19
Test Pit 17

Photograph 22
Test Pit 20

Photograph 20
Test Pit 18

Photograph 23
Test Pit 22

Photograph 21
Test Pit 19

Photograph 24
Test Pit 23

Photograph 25
Test Pit 24

Photograph 26
Test Pit 25

Photograph 27
Test Pit 26

Photograph 28
Test Pit 27

Photograph 29
Test Pit 28

Photograph 30
Test Pit 29

Photograph 31
Test Pit 30

Photograph 34
Test Pit 33

Photograph 32
Test Pit 31

Photograph 33
Test Pit 32

APPENDIX B

Extracts of Additional Contamination (Asbestos) Report
Ref JC17302A-r2(rev) dated January 2018

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown, NSW 2148, Australia
PO Box 1543, Macquarie Centre. North Ryde, NSW 2113
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Report

Additional Contamination (Asbestos) Assessment and Remediation Action Plan (RAP) Proposed Car Park North Street, Penrith, NSW

Prepared for
Penrith City Council
PO Box 60
PENRITH NSW 2751

Ref: JC17302A-r2(rev)
January 2018

Legend

TP 1 Test Pits (24/07/2017)

TP 18 Test Pits (17/10/2017)

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: SG	Date: 31/10/2017	Penrith City Council	
Checked By: SL	Date: 31/10/2017	North Street, Penrith	
Revision By:	Date:	Test Pit Location Plan	
Scale: Not to Scale	A3	Project No: JC17302A-r2	Drawing No: 1

Legend

TP 1 Test Pits with asbestos Impacted topsoil/fill

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: SG	Date: 31/10/2017	Penrith City Council	
Checked By: SL	Date: 31/10/2017	North Street, Penrith	
Revision By:	Date:	Plan Indicating Test Pits with Asbestos	
Scale: Not to Scale	A3	Project No: JC17302A-r2	Drawing No: 2

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Table 1 : Summary of Test Pit Profile

Client: Penrith City Council | Job Number: JC17302A-r2

Project: Proposed Temporary Car Park | Logged By: SG

Location: North Street, Penrith | Date: 31/10/2017

Test Pit Number	Depth (m) From	Depth (m) To	Material Description
1	0.00	0.40	Topsoil/Fill: Gravelly Silty Clay/Gravelly Clayey Silt: low liquid limit/low plasticity, brown with fine grained gravel, minor plastic and 1x cobble, dry
	0.40	0.70	(CH) Silty Clay: high plasticity, red brown, dry to moist
2	0.00	0.40	Topsoil/Fill: Gravelly Silty Clay/Gravelly Clayey Silt: low liquid limit/low plasticity, brown with fine grained gravel, 1x brick fragment and trace of sand, dry
	0.40	1.10	(CH) Silty Clay: high plasticity, red brown, dry to moist, PP=360kPa, very stiff
	1.10	1.60	(CI) Silty Clay: medium plasticity, red and grey with fine grained gravel, dry to moist
3	0.00	0.50	Topsoil/Fill: Gravelly Silty Clay/Gravelly Clayey Silt: low liquid limit/low plasticity, brown with fine grained gravel, and concrete, porcelain and glass fragments, dry to moist
	0.50	0.80	(CH) Silty Clay: high plasticity, red brown, moist, PP=310kPa, very stiff
4	0.00	0.30	Topsoil/Fill: Gravelly Silty Clay/Gravelly Clayey Silt: low liquid limit/low plasticity, brown with fine grained gravel, 1x brick and asbestos fragment, dry
	0.30	0.50	(CH) Silty Clay: high plasticity, red brown, dry to moist
5	0.00	0.50	Topsoil/Fill: Gravelly Silty Clay/Gravelly Clayey Silt: low liquid limit/low plasticity, brown with fine grained gravel, dry to moist
	0.50	0.70	(CI) Silty Clay: medium plasticity, grey brown, moist, PP=300, very stiff
6	0.00	0.40	Topsoil/Fill: Clayey Silt: low liquid limit, brown with brick and glass fragments, dry to moist
	0.40	0.60	(CH) Silty Clay: high plasticity, red brown, dry to moist
7	0.00	0.20	Fill: Crushed Sandstone
	0.20	0.45	Topsoil/Fill: Clayey Silt: low liquid limit, brown with gravel and 1 asbestos piece, dry
	0.45	0.70	(CH) Silty Clay: high plasticity, red brown, dry to moist
8	0.00	0.40	Topsoil/Fill: Clayey Silt: low liquid limit, brown with gravel, metal pipe, and 2x asbestos fragments, dry
	0.40	0.60	(CH) Silty Clay: high plasticity, red brown, dry to moist
9	0.00	0.20	Fill: Crushed Sandstone
	0.20	0.35	Topsoil/Fill: Clayey Silt: low liquid limit, brown with glass fragments, dry
	0.35	0.60	(CH) Silty Clay: high plasticity, red brown, dry to moist
10	0.00	0.50	Topsoil: Clayey Silt: low liquid limit, brown with river gravel, dry to moist
	0.50	0.70	(CH) Silty Clay: high plasticity, brown, dry to moist
11	0.00	0.30	Topsoil/Fill: Clayey Silt: low liquid limit, brown with abundant bricks, dry
	0.30	0.70	(CH) Silty Clay: high plasticity, brown red, dry, PP=410-450kPa, hard
12	0.00	0.35	Topsoil/Fill: Gravelly Clayey Silt: low liquid limit, brown with 3x asbestos fragments, dry
	0.35	0.60	(CH) Silty Clay: high plasticity, brown, dry to moist
			Notes:
			MC = Moisture Content.
			PL = Plastic Limit.
			PP = Pocket Penetrometer.

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Table 1 : Summary of Test Pit Profile

Client: Penrith City Council | Job Number: JC17302A-r2

Project: Proposed Temporary Car Park | Logged By: SG

Location: North Street, Penrith | Date: 31/10/2017

Test Pit Number	Depth (m) From	Depth (m) To	Material Description
13	0.00	0.25	Topsoil/Fill: Sandy Silt: low liquid limit, brown with concrete fragments and gravel, dry
	0.25	0.35	Fill: Gravelly Silty Clay: medium plasticity, brown with concrete, tile and porcelain fragments, dry
	0.35	0.60	(CH) Silty Clay: high plasticity, brown, dry, PP=450kPa, hard
14	0.00	0.40	Topsoil/Fill: Clayey Silt: low liquid limit, brown with tile and brick fragments, glass, timber, PVC and concrete pieces, dry
	0.40	0.70	(CH) Silty Clay: high plasticity, brown, dry
15	0.00	0.45	Topsoil/Fill: Gravelly Clayey Silt: low liquid limit, brown with fine to coarse grained gravel, brick fragments and 1x asbestos piece, dry
	0.45	0.90	(CI-CH) Silty Clay: medium to high plasticity, brown, dry to moist, PP=310-330kPa, very stiff
	0.90	1.60	(CI) Silty Clay: medium plasticity, brown with fine grained gravel, dry
16	0.00	0.40	Topsoil/Fill: Gravelly Sandy Silt: low liquid limit, brown with fine to coarse grained gravel and brick fragments, dry
	0.40	0.70	Topsoil: Clayey Silt, low liquid limit, dark brown, moist
	0.70	1.10	(CI-CH) Silty Clay: medium to high plasticity, brown, dry to moist, PP=300kPa, very stiff
17	0.00	0.60	Topsoil/Fill: Gravelly Clayey Silt: low liquid limit, brown with brick fragments, glass, tile, asphalt, river gravel and asbestos
	0.60	0.90	(CI-CH) Silty Clay: medium to high plasticity, brown, dry
18	0.00	0.80	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, PVC pipe, sandstone gravel, brick fragment, glass, concrete fragment, dry
	0.80	1.10	Topsoil: Clayey Silt: Low liquid limit, brown, dry
	1.10	1.30	(CI-CH) Silty Clay: Medium to high plasticity, brown, dry
19	0.00	0.90	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with brick fragments, rusty metal, plastic bottle, orange conduit, Asbestos fragment at 0.5m, sandstone gravel, porceline and glass fragments, dry
	0.90	1.20	Topsoil: Clayey Silt: Low liquid limit, brown, dry
	1.20	2.00	(CI-CH) Silty Clay: Medium to high plasticity, brown, dry
20	0.00	0.35	Tospoil/Fill: Clayey Silt: Low liquid limit, brown, with porceline, asbestos at 0.1m, brick fragments, river gravel, dry
	0.35	0.70	(CH) Silty Clay: High plasticity, red brown, dry
21	0.00	0.35	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with brick, glass and wood fragments, dry
	0.35	0.50	(CH) Silty Clay: High plasticity, red brown, dry
22	0.00	0.50	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with shale cobbles, roots, minor fabric and porceline fragments, dry
	0.50	0.70	(CH) Silty Clay: High plasticity, red brown, dry
23	0.00	0.40	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with brick fragments, masonite board, Silty Clay inclusions, dry
	0.40	0.60	(CH) Silty Clay: High plasticity, red brown, dry
24	0.00	0.30	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with river gravel and porceline, dry
	0.30	0.50	(CH) Silty Clay: High plasticity, red brown, dry
			Notes:
			MC = Moisture Content.
			PL = Plastic Limit.
			PP = Pocket Penetrometer.

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Table 1 : Summary of Test Pit Profile

Client: Penrith City Council | Job Number: JC17302A-r2

Project: Proposed Temporary Car Park | Logged By: SG

Location: North Street, Penrith | Date: 31/10/2017

Test Pit Number	Depth (m) From	Depth (m) To	Material Description
25	0.00	0.35	Topsoil/Fill: Silty Clay/Clayey Silt: Low plasticity, brown, gravel, dry
	0.35	0.60	(CH) Silty Clay: High plasticity, red brown, dry to moist
26	0.00	0.50	Topsoil/Fill: Silty Clay/Clayey Silt: Low liquid limit, brown, with asbestos at 0.3m, brick and porceline fragments, ash, gravel, dry
	0.50	0.80	(CH) Silty Clay: High plasticity, red brown, dry
27	0.00	0.60	Topsoil/Fill: Clayey Silt/Silty Clay: Low plasticity, brown, with brick fragments, car axle, river pebble, shale gravel, glass, dry
	0.60	0.90	(CI-CH) Silty Clay: Medium to high plasticity, brown, dry
28	0.00	0.55	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with concrete gravel, asbestos at 0.3m, plastic, wire, porceline, glass, and brick fragments, dry
	0.55	0.70	(CH) Silty Clay: High plasticity, red brown, dry
29	0.00	0.30	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with concrete gravel, glass and concrete gravel, dry
	0.30	0.60	(CH) Silty Clay: High plasticity, red brown, dry
30	0.00	0.30	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with concrete gravel, asbestos fragment at 0.1m, dry
	0.30	0.60	(CH) Silty Clay: High plasticity, red brown, dry
31	0.00	0.40	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with concrete and brick fragments, wire, glass and asbestos at 0.2m
	0.40	0.60	(CH) Silty Clay: High plasticity, red brown, dry
32	0.00	0.20	Topsoil/Fill: Silty Clay/Clayey Silt: Low plasticity, red brown, with gravel, dry
	0.20	0.50	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with ash, brick fragments, asbestos at 0.3m, dry
	0.50	0.80	Topsoil: Clayey Silt: Low liquid limit, brown, dry
	0.80	1.80	(CH) Silty Clay: High plasticity, red brown, dry
33	0.00	0.50	Topsoil/Fill: Clayey Silt/Silty Clay: Low plasticity. Brown, with brick, tile, glass fragments, river gravel, dry
	0.50	0.70	(CH) Silty Clay: High plasticity, red brown, dry
34	0.00	0.40	Topsoil/Fill: Clayey Silt/Silty Clay: Low liquid limit, brown, with brick, concrete, sandstone and terracotta fragments, dry
	0.40	0.60	(CH) Silty Clay: High plasticity, red brown, dry
35	0.00	0.30	Topsoil/Fill: Clayey Silt: Low liquid limit, brown, with river gravel, dry
	0.30	0.50	(CH) Silty Clay: High plasticity, red brown, dry

Notes:
MC = Moisture Content.
PL = Plastic Limit.
PP = Pocket Penetrometer.

Sample	Depths (m)	Sample Date	Sample Type	Analysis															
				pH	Heavy Metals								OCP	PCB	TRH	BTEX	PAH	Asbestos	TCLP (Heavy Metals + PAH)
					As	Cd	Cr	Cu	Pb	Hg	Ni	Zn							
TP4	0.0-0.1	24/07/2017	Soil/ACM	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP7	Fragments	24/07/2017	ACM															o	
TP8	Fragments	24/07/2017	ACM															o	
TP12	Fragments	24/07/2017	Soil/ACM															o	
TP15	Fragments	24/07/2017	ACM															o	
TP17	0.2-0.3	24/07/2017	Soil	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o

Note: O denotes tested

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TABLE 2

Analytical Program

Penrith City Council
Proposed Temporary Car Park
North Street Penrith

Prepared By:SL Date: 27/11/2017
Checked By:__SG___Date:27/11/2017

Sample	Depths (m)	pH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
TP 4	0.00-0.10	6.6	7	0.6	15	37	320	0.1	9	580
TP17	0.2-0.3	5.4	15	<0.4	15	100	330	1	8	120
HBILs 'A' Criteria			100	20	100 (VI)	600	300	40	400	7400
HBILs 'C' Criteria			300	90	300 (VI)	17000	600	80	1200	30000

Notes

1) All results are expressed as mg/kg and pH (units).

2) Figures in bold italics exceed the EIL Criteria

3) Figures in bold italics exceed the HBIL 'A' Criteria

4) Ambient Background Concentrations

5) Added Contaminant Limits

* EIL = ABC+ACL

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TABLE 3

Summary of Analytical Results - Heavy Metals

Penrith City Council

Proposed Temporary Car Park

North Street Penrith

Sample	Depths (m)	HCB	alpha-BHC	gamma-BHC	beta-BHC	Heptachlor	delta-BHC	Aldrin	Heptachlor Epoxide	gamma-Chlordane	alpha-chlordane	Endosulfan I	pp-DDE	Dieldrin	Endrin	pp-DDD	Endosulfan II	pp-DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor	Total OCP
TP 4	0.00-0.10	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP17	0.2-0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
HBILs 'A' Criteria		10				6		6		50		270	240	6	10	240		240			300	
HBILs 'C' Criteria		10				10		10		70		340	400	10	20	400		400			400	

Notes

1) All results are expressed as mg/kg and pH (units).

2) Figures in bold italics exceed the HBILs 'A' Criteria

3) Figures in bold italics and underlined exceed the HBILs 'C' Criteria

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TABLE 4

Summary of Analytical Results - OCP

Penrith City Council

Proposed Temporary Car Park

North Street Penrith

Prepared by: SL Date: 27/11/2017
Checked By:__SG___Date:27/11/2017

Sample	Depths (m)	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Total PCB
TP 4	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP17	0.2-0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
HBILs 'A' Criteria									1
HBILs 'C' Criteria									1

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TABLE 5
Summary of Analytical Results - PCB

Penrith City Council
Proposed Temporary Car Park
North Street Penrith

Notes

1) All results are expressed as mg/kg and pH (units).
2) Figures in bold italics exceed the HBILs 'A' Criteria
3) Figures in bold italics and underlined exceed the HBILs 'C' Criteria

Sample	Depths (m)	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	C_{10}-C_{36}	F1 (4) C_6-C_{10}	F2 (5) $>C_{10}$-C_{16}	F3 C_{16}-C_{34}	F4 C_{34}-C_{40}	Volatile Organic Compounds (VOC)					
											Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene
TP 4	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP17	0.2-0.3	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
NSW DEC (1994)		65				1000					1	1.4	3.1	14		
HSLs 'A and B' Criteria (CLAY)	0m to <1m						50	280			0.7	480	480	110		5
	1m to <2m						90				1			310		
	2m to < 4m						150				2					
	4m+						290				3					
ESL Criteria							180	120	1300	5600	65	105	125	45		

Notes

1) All results are expressed as mg/kg unless otherwise specified

2) Figures in bold exceed the NSW DEC criteria

3) ND Not detected

4) F1 is C_6-C_{10} minus the sum of the BTEX concentrations

5) F2 is $>C_{10}$-C_{16} Minus Napthalene

6) Figures in bold italics exceed the ESL Criteria

7) Figures in bold italics that have been underlined exceed the HSLs 'A and B' Criteria

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TABLE 6

Summary of Analytical Results - TRH and VOC

Penrith City Council

Proposed Temporary Car Park

North Street Penrith

Sample	Depths (m)	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Benzo(a)pyrene TEQ	Total PAHs
TP 4	0.00-0.10	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	0.2	<0.1	0.1	<0.2	0.1	0.1	<0.1	0.1	<0.5	1
TP17	0.2-0.3	<0.1	0.2	<0.1	0.1	2.4	0.5	6.5	5.8	2.2	2.1	3.8	2.4	2	0.5	1.9	3.8	31
HBILs 'A' Criteria		3															3*	300
HBILs 'C' Criteria																	3*	300
ESL Criteria													0.7					

Notes

1) All results are expressed as mg/kg

2) Figures in bold italics exceed the HBILs 'A' Criteria

3) Figures in bold italics and underlined exceed the HBILs 'C' Criteria

4) Figures in bold italics that have been underlined and shaded exceed the ESL Criteria

* B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products

PAH Species	TEF
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b+j)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Benzo(g,h,i)perylene	0.01
Chrysene	0.01
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-c,d)pyrene	0.1

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TABLE 7
Summary of Analytical Results - PAH

Penrith City Council
Proposed Temporary Car Park
North Street Penrith

Sample	Depths (m)	Asbestos
TP4	0.0-0.1	ACM - Chrysotile and Amosite/No Friable
TP7	Fragments	ACM - Chrysotile, Amosite and Crocidolite
TP8	Fragments	ACM - Chrysotile and Amosite
TP12	Fragments	ACM - Chrysotile, Amosite and Crocidolite
TP15	Fragments	ACM - Chrysotile, Amosite and Crocidolite
TP17	0.2-0.3	ACM - Chrysotile and Amosite/No Friable
HBILs 'A' Criteria		0.01% / 0.001% [1]
HBILs 'C' Criteria		0.02% / 0.001% [1]

Note: ND = Not detected

Measured in %w/w

1) Bonded Asbestos Contaminaint Material / Fiberous Asbestos and Asbestos Fines

2) Figures in bold italics exceed the HBILs 'A' Criteria

3) Figures in bold italics and underlined exceed the HBILs 'A' Criteria

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TABLE 8

Summary of Analytical Results - Asbestos

Penrith City Council

Proposed Temporary Car Park

North Street Penrith

Sample	Depths (m)	Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	PAH
TP 4	0.00-0.10	<0.05	<0.01	<0.01	0.07	<0.0005	<0.02	0.001
TP17	0.2-0.3	<0.05	<0.01	<0.01	0.1	<0.0005	<0.02	ND

Notes

1) All results are expressed as mg/L

GeoEnviro Consultancy

TABLE 9

Summary of Analytical Results - (TCLP) Heavy Metals and PAH

Penrith City Council

Proposed Temporary Car Park

North Street Penrith

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

CERTIFICATE OF ANALYSIS 172091

Client Details

Client	Geoenviro Consultancy Pty Ltd
Attention	Solern Liew
Address	PO Box 1543, Macquarie Centre, North Ryde, NSW, 2113

Sample Details

Your Reference	**JC17302A, Penrith**
Number of Samples	2 soils 5 materials
Date samples received	25/07/2017
Date completed instructions received	25/07/2017

Analysis Details

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

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

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

Report Details

Date results requested by	03/08/2017
Date of Issue	03/08/2017

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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Report Comments

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 172091-1 & 7 were sub-sampled from jars provided by the client.

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lulu Scott

Results Approved By
Dragana Tomas, Senior Chemist
Long Pham, Team Leader, Metals
Lulu Scott, Asbestos Supervisor
Steven Luong, Chemist

Authorised By

David Springer, General Manager

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date extracted	-	27/07/2017	27/07/2017
Date analysed	-	27/07/2017	27/07/2017
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	101	107

svTRH (C10-C40) in Soil			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date extracted	-	27/07/2017	27/07/2017
Date analysed	-	28/07/2017	28/07/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	90	92

PAHs in Soil			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date extracted	-	27/07/2017	27/07/2017
Date analysed	-	28/07/2017	28/07/2017
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.1
Phenanthrene	mg/kg	0.1	2.4
Anthracene	mg/kg	<0.1	0.5
Fluoranthene	mg/kg	0.2	6.5
Pyrene	mg/kg	0.2	5.8
Benzo(a)anthracene	mg/kg	<0.1	2.2
Chrysene	mg/kg	0.1	2.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	3.8
Benzo(a)pyrene	mg/kg	0.1	2.4
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	2.0
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.5
Benzo(g,h,i)perylene	mg/kg	0.1	1.9
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	3.8
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	3.8
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	3.8
Total +ve PAH's	mg/kg	1.0	31
Surrogate p-Terphenyl-d14	%	91	100

Organochlorine Pesticides in soil			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date extracted	-	27/07/2017	27/07/2017
Date analysed	-	27/07/2017	27/07/2017
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	0.2	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	0.2	<0.1
gamma-Chlordane	mg/kg	0.3	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	94	94

PCBs in Soil			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date extracted	-	27/07/2017	27/07/2017
Date analysed	-	27/07/2017	27/07/2017
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	94	94

Acid Extractable metals in soil			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date prepared	-	27/07/2017	27/07/2017
Date analysed	-	27/07/2017	27/07/2017
Arsenic	mg/kg	7	15
Cadmium	mg/kg	0.6	<0.4
Chromium	mg/kg	15	15
Copper	mg/kg	37	100
Lead	mg/kg	320	330
Mercury	mg/kg	0.1	1.0
Nickel	mg/kg	9	8
Zinc	mg/kg	580	120

Moisture			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date prepared	-	27/07/2017	27/07/2017
Date analysed	-	28/07/2017	28/07/2017
Moisture	%	7.8	11

Metals in TCLP USEPA1311			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date extracted	-	27/07/2017	27/07/2017
Date analysed	-	27/07/2017	27/07/2017
pH of soil for fluid# determ.	pH units	9.4	8.4
pH of soil TCLP (after HCl)	pH units	1.5	1.5
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.0	4.9
Arsenic in TCLP	mg/L	<0.05	<0.05
Cadmium in TCLP	mg/L	<0.01	<0.01
Chromium in TCLP	mg/L	<0.01	<0.01
Lead in TCLP	mg/L	0.07	0.1
Mercury in TCLP	mg/L	<0.0005	<0.0005
Nickel in TCLP	mg/L	<0.02	<0.02

PAHs in TCLP (USEPA 1311)			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date extracted	-	28/07/2017	28/07/2017
Date analysed	-	28/07/2017	28/07/2017
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	0.001	NIL (+)VE
Surrogate p-Terphenyl-d14	%	74	82

Asbestos ID - soils			
Our Reference		172091-1	172091-7
Your Reference	UNITS	TP4	YP 17
Depth		0.0-0.1	0.2-0.3
Date Sampled		24/07/2017	24/07/2017
Type of sample		Soil	Soil
Date analysed	-	3/08/2017	3/08/2017
Sample mass tested	g	Approx. 40g	Approx. 45g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Asbestos ID - materials						
Our Reference		172091-2	172091-3	172091-4	172091-5	172091-6
Your Reference	UNITS	TP4 ACM	TP7 ACM	TP8 ACM	TP12 Fibro and ACM	TP15 ACM
Depth		-	0.2-0.21	-	-	-
Date Sampled		24/07/2017	24/07/2017	24/07/2017	24/07/2017	24/07/2017
Type of sample		material	material	material	material	material
Date analysed	-	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017
Mass / Dimension of Sample	-	48x35x5mm	33x20x5mm	60x50x5mm	90x80x5mm	80x55x5mm
Sample Description	-	Grey compressed fibre cement material	Grey fibrous sheet material	Grey compressed fibre cement material	Grey compressed fibre cement material	Grey compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
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.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Date analysed	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	104	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	94	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	92	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	110	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Date analysed	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
Surrogate o-Terphenyl	%		Org-003	90	[NT]	[NT]	[NT]	[NT]	91	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Date analysed	-			28/07/2017	[NT]	[NT]	[NT]	[NT]	28/07/2017	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	83	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	99	[NT]	[NT]	[NT]	[NT]	118	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Date analysed	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	92	[NT]	[NT]	[NT]	[NT]	120	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Date analysed	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCLMX	%		Org-006	92	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date prepared	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Date analysed	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	114	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	109	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Date analysed	-			27/07/2017	[NT]	[NT]	[NT]	[NT]	27/07/2017	[NT]
Arsenic in TCLP	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	[NT]	[NT]	116	[NT]
Cadmium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	120	[NT]
Chromium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	[NT]	[NT]	114	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			28/07/2017	[NT]	[NT]	[NT]	[NT]	28/07/2017	[NT]
Date analysed	-			28/07/2017	[NT]	[NT]	[NT]	[NT]	28/07/2017	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	76	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	74	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	71	[NT]
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	70	[NT]
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	71	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	73	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	74	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	92	[NT]	[NT]	[NT]	[NT]	78	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
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ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
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SAMPLE RECEIPT ADVICE

Client Details	
Client	Geoenviro Consultancy Pty Ltd
Attention	Solern Liew

Sample Login Details	
Your Reference	JC17302A, Penrith
Envirolab Reference	**172091**
Date Sample Received	25/07/2017
Date Instructions Received	25/07/2017
Date Results Expected to be Reported	**03/08/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	2 soils 5 materials
Turnaround Time Requested	Standard
Temperature on receipt (°C)	15.5
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

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Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Metals in TCLP USEPA1311*	*PAHs in TCLP (USEPA 1311)*	*Asbestos ID - soils*	*Asbestos ID - materials*
TP4-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TP4 ACM										✓
TP7ACM-0.2-0.21										✓
TP8ACM										✓
TP12 Fibro and ACM										✓
TP15 ACM										✓
YP 17-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	

APPENDIX C

Unexpected Finds Protocol (Supporting Guidelines)

<table>
<tr><th>ITEM</th><th colspan="2">REQUIREMENTS</th></tr>
<tr><td>DEFINITION</td><td colspan="2">An unexpected find may be identified as a result of site activity, for example through earthworks and movement of plant on site including preparatory site works when vegetation is being slashed.</td></tr>
<tr><td>SITE SUPERVISOR</td><td colspan="2">On being notified of an Unexpected Find , the Principal Contractor must:
Stop work & notify the site manager/HSE coordinator as soon as practically possible.
Ensure the find is not further disturbed.
Ensure all personnel are removed from the area with the exception of personnel required to isolate or make safe the area.
Establish an “unexpected find” isolation zone as required to prevent or minimise exposure risks for site personnel, members of the public, fauna or flora. Note: Persons are not to expose themselves to further risk whilst establishing isolation zone.
Assess the requirement to evacuate areas or the entire site.
Co-ordinate site or area evacuation as assessed. Note: It is preferable to evacuate the whole site if there is any doubt as to the safety of personnel or the environment.
As soon as the safety of personnel, environment & the site is secured the Site Manager/Supervisor should notify their relevant HSE Manager, Project Manager & Construction Manager.
As soon as practically possible record the events associated with the unexpected find.</td></tr>
<tr><td rowspan="2">PROJECT MANAGER</td><td colspan="2">The Project Manager and/or HSE Manager in consultation with the relevant General Manager notify regulatory authorities as required.
Establish a risk based process for managing clearance of the unexpected find & establishing incident investigation.</td></tr>
<tr><td colspan="2">The Project Manager or HSE Manager must also ensure that the find is reported to the Principal (Council).
This may be by verbal communication in the first instance & then via E.Diary.</td></tr>
<tr><td>UNEXPLODED ORDNANCE</td><td colspan="2">Do not touch or disturb.
Contact Police immediately.</td></tr>
<tr><td>UNEXPECTED SERVICES (LIVE OR DISUSED)</td><td colspan="2">This may include power, gas or fuel.
Do not touch or further disturb.
The area must be immediately designated a non-smoking and “no naked flames” area.
All nearby machinery should be turned off.
Contact relevant governing authority.
Contact appropriate trade supervisor.</td></tr>
<tr><td rowspan="2">ASBESTOS OR OTHER CONTAMINANTS</td><td colspan="2">Products made from asbestos cement not only include fibro sheeting (flat and corrugated), but items such as water, drainage and flue pipes, roofing shingles and gutters.
Do not touch or further disturb.
Isolate area (10 metre isolation zone required for asbestos).
Contact hygienist.
Implement hygienist’s recommendations.
If persons have been exposed arrange medical advice/consultation i.e. possible asbestos fibre exposure will require lung function test & chest x-ray. Note: This applies more specifically to friable type asbestos rather than non friable asbestos containing material however if any doubt exists treat as friable.
Obtain clearance from hygienist prior to re-entering area.
Refer to SP-18 Health Surveillance.</td></tr>
<tr><td>Non-Friable Asbestos
Over 97% of the products in Australia were non-friable material in which the Asbestos fibres were bonded by cement, vinyl, resin or other similar material.</td><td>Friable Asbestos
The hazardous friable asbestos is material which can be crumbled, pulverised, or reduced to powder by hand pressure. This may also include previously non-friable material which becomes broken or damaged by mechanical force.</td></tr>
</table>

ITEM	REQUIREMENTS
HUMAN REMAINS	• Do not touch or disturb. • Contact Police immediately. Please note that aboriginal burial objects (such as bark coffins) are defined by legislation as human remains.
EUROPEAN CULTURAL HERITAGE ITEMS	• Do not touch or disturb. • Contact Heritage Office or relevant State or Local Government Authority.
OBJECTS OF POSSIBLE CULTURAL SIGNIFICANCE	• Do not touch or disturb. Contact Department of Indigenous Affairs or relevant State or Local Government Authority.
UNEXPECTED FIND PROCESS	**Unexpected Find Discovered** ↓ **Person Uncovering Find** 1. Stop work 2. Consider personnel safety etc 3. Notify Site Supervisor/ Manager 4. Mark location ↓ **Site Supervisor/Manager** • Establish Unexpected Find isolation zone as required ↓ **Project Manager/Construction Manager** • In consultation with State General Manager/HSE Manager notify relevant authority (where required) • Complete Incident Register in site diary

APPENDIX D

Important Information about your Environmental Site Assessment

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IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

This Environmental Assessment Report was performed in general conformance with our understanding of the guidelines by the Australian and New Zealand Conservation Council (ANZECC), the Office of Environment and Heritage (OEH) and the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013).

These accompanying notes have been prepared by GeoEnviro Consultancy Pty Ltd, using guidelines prepared by ASFE; The Association of Engineering Firms Practising in the Geosciences. The notes are offered as an aid in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL SITE ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre- acquisition assessment on behalf of either a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has change, eg 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, eg, a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to the assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible, quantify the risks which unrecognised contamination poses to the ongoing or proposed activity. Such risk may be both financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination within a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur, only the most likely contaminants are screened.

AN ENVIRONMANTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

Your environmental assessment report should not be used;

- When the nature of the proposed development is changed, eg, if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered, eg, 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

In order to avoid costly problems, you should ask your consultant to assess any changes in the project since the assessment and the implications, if any, to recommendations made in the assessment.

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 scientist and opinions are drawn about the overall subsurface 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 owner should retain the services of their consultants throughout the development stage of the project in order to identify variances, conduct additional tests which 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 GeoEnviro Consultancy 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, that 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 which 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 or specific individuals. An assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another civil engineer.

An assessment should not be used by other persons for any purpose, or by the client for a different purposes. No individual, other than the client, should apply an assessment, even for its intended purposes, without first conferring with the consultant. No person should apply an assessment for any purposes 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 FORM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologist, based upon interpretation of field conditions and laboratory evaluation of field samples. Field logs normally provided in our reports and these should 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 test of the assessment. Should this occur, delays and disputes , or unanticipated costs may result.

To reduce the likelihood of boreholes and test pit logs 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 claim 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.