Soil Contamination Investigation

NSW Public Works

Bank Street, Pyrmont NSW

June 2010

Our Ref: SP0062: 82962

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Soil Contamination Investigation

NSW Public Works

Bank Street, Pyrmont NSW

Executive Summary

Introduction

Noel Arnold & Associates Pty Ltd (NAA) was commissioned by the NSW Public Works to undertake a Soil Contamination Investigation (SCI) of a portion of land located under ANZAC Bridge at Bank Street, Pyrmont NSW. NAA undertook the SCI in June 2010 with site soil sampling undertaken on 18 June 2010.

Objective

The objective of the SCI is to provide information about potential soil contamination on the portion of land located at Bank Street, Pyrmont NSW. This SCI was undertaken prior to planned development works at the site.

Results

Contaminant	Samples	Summary of Findings
Total Petroleum Hydrocarbon (TPH)	8	The Soil Investigation Level (SIL) was exceeded by TPH (C_{10}-C_{36}) in two samples (TP05-0.4m and TP07-0.3m).
Benzene, Toluene, Xylene and Ethylbenzene (BTEX)	8	The SIL was not exceeded by BTEX. The laboratory detection limit was also not exceeded in any sample.
Heavy Metals	8	The SIL was not exceeded by any heavy metal analysed.
Volatile Organic Compounds (VOCs)	4	The SIL was not exceeded by VOCs. The laboratory detection limit was also not exceeded in any sample.
Polycyclic Aromatic Hydrocarbons (PAHs)	8	The SILs for Benzo(a)Pyrene and Total PAHs were exceeded by in five samples (TP03-0.6m, TP05-0.4m, TP06-0.5m, TP07-0.3m, and TP08-0.3m).
Asbestos	4	Asbestos was not detected above the reporting limit in any sample analysed.

Conclusion and Recommendation

The results of this SCI indicate that parts of the site were previously a bitumen car park. Soil sampling results indicate the targeted areas of soil of the land located at Bank Street, Pyrmont NSW do not comply with the adopted SILs for the proposed use as a public boat ramp. As such, the soils of the site which were investigated as part of this SCI are not considered suitable for use in construction of the boat ramp.

The following should be undertaken as part of the redevelopment:

- Soil should be excavated and stockpiled according to visual similarities (i.e. road-base stockpiled with road-base, bitumen with bitumen, sand fill with sand fill etc).
- As part of the excavation works, building/demolition rubble should be removed to the extent practical and separately stockpiled.
- Each stockpile should then be visually inspected and/or sampled according to the NSW DECCW *Waste Classification Guidelines*, 2008 and given a waste classification.
- If suspected clean stockpiles are developed, this material should be sampled and compared to the NSW DECCW *ENM Exemption*, 2008 criteria for potential beneficial reuse on the site.
- Material not able to be beneficially reused on the site should then be disposed off-site to a suitably licensed facility.

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Statement of Limitations - Environment

This report has been prepared in accordance with the agreement between NSW Public Works ("The Client") and Noel Arnold & Associates Pty Ltd ("The Company").

Within the limitations of the agreed upon scope of services, this assessment has been undertaken and performed in a professional manner, in accordance with generally accepted practices, using a degree of skill and care ordinarily exercised by members of its profession and consulting practice. No other warranty, expressed or implied, is made.

This report is solely for the use of The Client and any reliance of this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties or for other uses. This report shall only be presented in full and may not be used to support any other objective than those set out in the report, except where written approval with comments are provided by The Company.

Sampling Risks

It is noted that professional judgment has been used to interpret the data obtained from site sampling and subsequent laboratory testing in order to characterise contamination that is present on site. The Client accepts that even a comprehensive sampling and testing program, implemented with the appropriate equipment and experienced personnel under the direction of a trained professional who functions in accordance with a professional standard of care, may fail to detect certain conditions because they are hidden and therefore cannot be considered in development of a sub-surface exploration program.

The extent of soil sampling and analysis has been targeted towards areas where contamination is considered to be most likely based on-site history and visual assessment. The methods adopted are in accordance with recognised industry standards. This approach maximises the probability of identifying contaminants. However, it may not identify contamination that occurs in unexpected locations or from unexplained sources. Soil contamination can be expected to be non-homogenous across the stratified soils where present on site, and the concentrations of contaminants may vary significantly within areas where the contamination has occurred. For this reason the results should be regarded as indicative only.

Contaminant movement within the soil and within ground water can follow paths of high permeability and it is possible that sampling will not have intersected these preferential pathways. In the case of groundwater, the flow can follow relatively narrow migration paths within minor aquifers. The Company is available to explain these risks, changes and risk reduction methods to The Client, but in any event, the scope of services included with the Proposal is that which The Client agreed to or selected in light of his own risk preferences and other considerations.

Sampling of soil or ground water may result in contamination of certain sub-surface areas, as when a probe or boring device moves through a contaminated area, linking it to an aquifer or other water body not previously contaminated. The Company has applied it best efforts to minimise and eliminate such cross contamination during the conduct of any sub-surface investigation. Because sub-surface sampling is a necessary aspect of the work which The Company may perform on The Client's behalf, The Client waives any claims against The Company and agrees to defend, indemnify and hold The Company harmless from any claims or liability for injury or loss which may arise as a result of alleged cross contamination caused by sampling.

Reliance on Information Provided by Others

Whilst the techniques used in the assessment are in accordance with recognised industry standards, the investigations also rely on information provided to The Company by third parties. Naturally, The Company cannot guarantee completeness or accuracy of any descriptions or conclusions based on information supplied to it during site surveys, visits and interviews. The extent of risk The Client wishes to accept is something which The Client must determine and accordingly, The Client waives any claim against The Company and agrees to defend, indemnify and hold The Company harmless from any claim or liability for injury or loss allegedly arising from errors, omissions or inaccuracies in documents or other information provided to The Company by The Client.

Recommendations for Further Study

The Company's preliminary findings which may result from this investigation/study may require verification through further analytical testing programs. The final decision to conduct additional investigative activities will be dependent upon The Client's assessment of the business risks involved. The Client agrees to hold The Company harmless from any claim, losses or damages arising out of The Client's rejection of any additional work suggested by The Company as a result of the work performed hereunder.

1. Introduction

Noel Arnold & Associates Pty Ltd (NAA) was commissioned by the NSW Public Works to undertake a Soil Contamination Investigation (SCI) of the portion of land under ANZAC Bridge located at Bank Street, Pyrmont NSW.

Nick Passlow and Hayley Given of NAA undertook the SCI in June 2010 with the soil sampling component of the project undertaken on 18 June 2010.

Refer to **Appendix A** for Site Locality Map and **Appendix B** for Site Layout Diagram.

2. Objective

The objective of the SCI is to provide information about potential soil contamination on the portion of land located at Bank Street, Pyrmont NSW. This SCI was undertaken prior to planned development works at the site. The proposed site use is a boat ramp.

3. Scope of Work

NAA were commissioned to prepare this SCI of the site. A soil sampling program was undertaken as part of this SCI, with a total number of eight test pit locations selected and excavated to a maximum depth of 1.3 metres with samples taken at varying depths through the soil profile.

This report is not intended to constitute a Detailed Environmental Site Assessment (DESA) to NSW Department of Environment, Climate Change and Water (DECCW) guidelines and groundwater investigation works were not undertaken.

The scope of works was agreed by the client prior to commencement of work on site.

4. Methodology

The SCI was compiled using available information including:

- Discussion with representatives associated with the site;
- Site inspection and comprehensive walkover of the site;
- Searches of relevant databases;
- Excavation of eight judgemental test pits within accessible areas of the site;
- Collection and analysis of nine soil samples for a range of the following:
  - Total Petroleum Hydrocarbons (TPH);
  - Benzene, Toluene, Xylene and Ethylbenzene (BTEX);
  - Heavy Metals;
  - Volatile Organic Compounds (VOCs);
  - Polycyclic Aromatic Hydrocarbons (PAHs); and
  - Asbestos.
- Preparation of this report.

The SCI was undertaken in general accordance with guidelines prepared by the NSW DECCW *Guidelines for Consultants Reporting on Contaminated Sites,* 1997.

NAA undertook the SCI with reference to, but not limited to, the following documents:

- NSW DECCW: *Guidelines for the NSW Site Auditor Scheme (2nd Edition)*, April 2006;
- NSW DECCW: *Sampling Design Guidelines*, September 1995; and
- National Environmental Protection Council: *National Environmental Protection (Assessment of Site Contamination) Measure*, 1999.

5. Site Identification and Details

The site is a portion of land under ANZAC Bridge located at Bank Street, Pyrmont NSW. Pyrmont is an inner-city suburb of Sydney and is located two kilometres south-west of the Sydney central business district in the local government area of the City of Sydney. The site is currently undeveloped.

The land is accessed from Bank Street to the north, with much of the site located underneath the Western Distributor. The site comprises an irregular rectangle shaped parcel of land approximately 150m x 70m (~10,500m^2).

Table 1 summarises the surrounding land uses of the site:

Table 1: Surrounding Land Uses	
Direction	**Land Use**
North	Commercial development
South	Blackwattle Bay
East	Commercial/industrial development and Western Distributor
West	Anzac Bridge and Blackwattle Bay

5.1 NSW DECCW Contaminated Land Database

The NSW DECCW Contaminated Land Database was searched to determine if the subject site or any surrounding sites have been declared as contaminated sites.

Seven former notices relate to the Pyrmont Power Station located on Pyrmont Road, the most recent being from 1994. The notice published under section 35 of the *Environmentally Hazardous Chemicals Act 1985* states the EPA is satisfied that the required studies, remediation and validation works at the site had been carried out.

It should be noted that the Record of DECCW Notices for Contaminated Land (database) does not provide a record of all contaminated land in NSW or a list of all notifications of contamination received by the DECCW.

Refer to **Appendix C** for NSW DECCW Contaminated Land Database Search results.

5.2 Acid Sulfate Soils – ASRIS Database

A search of the Australia Soil Resource Information System (ASRIS) database shows the area is classed as *Category B3 – Low Probability/Low Confidence* for acid sulfate soils. The presence and/or absence of acid sulfate soils cannot be conclusively determined without a comprehensive soil sampling program.

Refer to **Appendix D** Acid Sulfate Soils maps.

6. Soil Contamination Investigation

6.1 Data Quality Objectives

Table 2 summarises the Data Quality Objectives NAA utilised for the project.

Table 2: Data Quality Objectives: **Seven Step Process – Soil Contamination Investigation**
Step 1: State the problem
SCI is to be undertaken to determine if the site has been impacted by contamination from current or historical uses.
Step 2: Identify the decision
SCI is to be undertaken to assess: ❑ Is contamination at the site significant? ❑ Does the contamination exceed relevant investigation levels? ❑ Does the contamination pose a risk to human health or the environment in its current state? ❑ Does the contamination affect the current or potential ongoing land uses of the site?
Step 3: Identify inputs to the decision
SCI is to be undertaken to attempt to quantify the following parameters: ❑ The type, distribution and nature of contamination at targeted areas of the site. ❑ The depth of contamination. ❑ The accessibility of contamination. ❑ The identification of potential receptors at the site or in the surrounding area. Note: Groundwater works were not undertaken as part of this SCI.
Step 4: Define the boundaries of the study
The SCI is limited to targeted areas of the site as identified by the client as forming part of the area of proposed development of the site as delineated in **Appendix B**.
Step 5: Develop a decision rule
Results of the SCI are compared with relevant soil based guidelines which are defined by relevant site uses, utilising information as recommended by NSW DECCW and other applicable agencies to determine if risk assessment, management, remediation or other action is required. This methodology is undertaken in accordance with NEPM, 1999.
Step 6: Acceptable limits on decision error
Results of the SCI are evaluated by assessment against predetermined data quality indicators including Documentation/Data Completeness, Comparability, Representativeness and Precision as specified in **Appendix E**.
Step 7: Optimise the design for obtaining data
The data collection method for the SCI has been optimised by the following: ❑ Undertaking judgemental sampling on the site. The SCI does not constitute a DESA according to NSW DECCW requirements and sampling density.

6.2 Soil Investigation

The soil sampling took place on 18 June 2010. A total number of eight sample locations were sampled to a maximum depth of 1.3m below ground level (mbgl) as follows:

- Durkin were utilised to scan for underground services.
- Ross Earthmoving were utilised for test-pitting works using a two-tonne excavator.

A total of eight soil samples were collected from various depths in the soil profile and analysed for a combination of the following analytes summarised in Table 3.

Table 3: Potential Contaminants.

Analyte	Rationale
TPH	TPH are found in diesel and electrical oils.
BTEX	BTEX are found in TPH products.
Heavy Metals	Heavy metals are also generally indicative of contaminated fill materials and can result from a variety of land uses and waste products.
VOCs	VOCs are often found in contaminated industrial fill.
PAHs	PAHs are found in diesel and TPH compounds and PAHs can also be indicative of ash or other contaminated fill materials resulting from the incomplete combustion of organic material.
Asbestos	Asbestos is a naturally occurring mineral with a range of industrial uses including fire retardant coatings, concrete, bricks, pipes and fireplace cement, heat, fire, and acid resistant gaskets, pipe insulation, ceiling insulation, fireproof drywall, flooring, and roofing.

6.3 Sampling Depth and Analysis

Sampling locations for the SCI were chosen on a judgemental sampling pattern. Table 4 summarises the details of each Test Pit (TP) location.

Table 4: Sampling Strategy

Test Pit ID	Test Pit Depth	Fill Depth	Sample Depth	Analysis Undertaken
TP01	0.45m	0.0-0.4m (rubble/sand); 0.4-0.45m (sandstone fill)	0.2m	TPH, BTEX, PAHs, metals, VOCs
TP02	1.3m	0.0-0.5m (rubble/sand); 0.5-0.6m (concrete fill); 0.6-1.3m (sandy fill)	0.5m	TPH, BTEX, PAHs, metals, asbestos
TP03	0.95m	0.0-0.5m (rubble/sand); 0.5-0.55m (concrete fill); 0.55-0.95m (sand)	0.6m	TPH, BTEX, PAHs, metals, VOCs
TP04	0.25m	0.0-0.2m (rubble/sand); 0.2-0.25m (sandstone)	0.1m	TPH, BTEX, PAHs, metals, asbestos
TP05	0.7m	0.0-0.3m (rubble/sand); 0.3-0.5m (roadbase); 0.5-0.7m (sand)	0.4m	TPH, BTEX, PAHs, metals, VOCs
TP06	1.0m	0.0-0.4m (rubble/sand); 0.4-0.5m (bitumen); 0.5-1.0m (grey road base)	0.5m	TPH, BTEX, PAHs, metals, asbestos
TP07	0.75m	0.0-0.4m (rubble/sand); 0.4-0.5m (bitumen); 0.5-0.75m (roadbase)	0.3m	TPH, BTEX, PAHs, metals, VOCs
TP08	0.5m	0.0-0.2m (rubble/fill); 0.2-0.25m (bitumen); 0.25-0.5m (roadbase)	0.3m	TPH, BTEX, PAHs, metals, asbestos

7. Soil Investigation Levels

7.1 Summary of Site Soil Investigation Levels

Soil Investigation Levels (SILs) are used to assess the significance of the concentrations of contaminants in soil. SILs are the concentration levels above which further appropriate investigation and evaluation are required. SILs include:

- Health based investigation levels (HILs);
- Provisional phytotoxicity-based investigation levels (PBILs); &
- Ecological investigation levels (EILs).

7.1.1 Adopted Investigation Levels

The investigation level adopted for the purposes of characterising soil at the Bank Street site are the HILs, *Column 3 – Parks, recreational open space, playing fields including secondary schools*. The Column 3 HILs have been chosen to allow for the proposed and ongoing use of the site as a public boat ramp.

7.1.2 Hierarchy of Assessment Guidelines

A number of guidelines have been produced to assist in the assessment of site contamination through the use of SILs. These guidelines have been used throughout this SCI to determine unacceptable levels of contamination. The hierarchy of guidelines is shown below:

- NSW DECCW *Guidelines for the NSW Site Auditor Scheme (2nd Edition)*, 2006;
- NSW DECCW *Guidelines for Assessing Service Station Sites,* 2004;
- EnHealth Health and Ecological Investigation Levels (i.e. NEPM); &
- Where NSW DECCW guidelines do not provide a specific investigation level for a contaminant, the other guidelines have been used, as appropriate.

7.2 Aesthetic Considerations

The NSW DECCW states that the aesthetic state of sites is required to be taken into account. An assessment of the site aesthetics requires consideration of the natural state of soil on any given site, and a comparison between it and the soil encountered during investigation works. In particular, soils on site should not exhibit the following:

- Discolouration (i.e. Staining);
- A malodorous nature (i.e. Odorous); or
- Abnormal consistency (i.e. Presence of demolition rubble, etc).

Where discolouration or odours are observed during field works, notes were taken on the field logging sheets and analytical results analysed to determine the possible cause of the abnormality. Where abnormal consistency was observed, such as the presence of building rubble within the soil matrix, this was also noted on the field logging sheets, to enable the extent of objectionable materials to be determined.

7.3 Summary of SILs Adopted

Table 5 summarises the SILs adopted for the site.

Table 5: Soil Investigation Levels

Contaminant	HIL (mg/kg)
TPH (C_6 – C_9)	65
TPH (C_{10} – C_{36})	1,000
Benzene	1
Toluene	130
Ethylbenzene	50
Xylene	25
Benzo(a)Pyrene	2
Total PAHs	40
Arsenic	200
Cadmium	40
Chromium	200
Copper	2,000
Lead	600
Mercury	30
Nickel	600
Zinc	14,000

8. Investigation Results

8.1 Surface Inspection Findings

Test-pitting was undertaken on portions of the site as specified by the client. During the site walkover no obvious surface contamination or stressed vegetation was noted or observed.

8.2 Contamination Investigation Results

Table 6 summarises soil sampling analysis results for the site:

Table 6: Soil Analysis Results

Contaminant	Samples	Summary of Findings
TPH	9	The Soil Investigation Level (SIL) was exceeded by TPH (C_{10}-C_{36}) in two samples (TP05-0.4m and TP07-0.3m).
BTEX	9	The SIL was not exceeded by BTEX. The laboratory detection limit was also not exceeded in any sample.
Heavy Metals	9	The SIL was not exceeded by any heavy metal analysed.
VOCs	4	The SIL was not exceeded by VOCs. The laboratory detection limit was also not exceeded in any sample.
PAHs	9	The SILs for Benzo(a)Pyrene and Total PAHs were exceeded by in five samples (TP03-0.6m, TP05-0.4m, TP06-0.5m, TP07-0.3m, and TP08-0.3m).
Asbestos	4	Asbestos was not detected above the reporting limit in any sample analysed.

Refer to **Appendix F** for Tabulated Analysis Results and **Appendix G** for full NATA certified analysis results.

8.3 Statistical Evaluation of Results

As six of the nine samples exceeded the SIL for Benzo(a)Pyrene and Total PAHs, the 95% Upper Confidence Limit (95% UCL) was not calculated for the site.

The 95% UCLs are a site-specific value determined by the sampling results. The 95% UCL indicates that there is a 95% probability the 'true' average contaminant concentration of the site will not exceed the 95% UCL value. A site that is considered uncontaminated or successfully remediated yields 95% UCLs that are below the soil investigation level given for the site.

9. Quality Assurance / Quality Control

NAA QA/QC procedures were implemented as part of this SCI to assess data quality. The QA/QC program included the following:

- Preservation of samples on ice during transport from the field to the laboratory.
- Transportation of samples with accompanying chain of custody documentation.
- Compliance with sample holding times.
- Review of internal analysis laboratory duplicates, laboratory splits and laboratory blanks.
- Collection and analysis of one blind replicate QA/QC sample.

9.1 Field Quality Control

Field quality control procedures used during the project comprised the use of one QA/QC sample taken through the project. Standard operating procedures for field QA/QC and equipment decontamination are provided in **Appendix E**.

Blind replicates are prepared in the field by duplicating the original sample and placing two equivalent portions into two separate containers. The blind duplicate sample was submitted to Envirolab Services Pty Ltd.

Assessment of field quality control duplicate samples was undertaken by calculating the Relative Percent Difference (RPD) of duplicate samples, and reviewing the concentrations detected. The criteria used for the assessment of RPDs is based on the NEPC (1999) Schedule B(3), which states the RPD between results of split samples should in general be less than 30%. However, this variation can be expected to be higher for organic analyses than for inorganic analyses, and for low concentration of analytes. RPDs can be expressed as:

$$RPD = \frac{(X1 - X2) \times 100\%}{(X1 + X2) / 2}$$

Where: X1 = Concentration of analyte in sample; &
X2 = Concentration of analyte in replicate.

It should be noted that:

- In instances where samples and/or their corresponding replicates returned concentrations of analytes below the detection limits, the detection limit is used for comparison.
- Low concentrations of analytes may result in a high relative percentage with differences in real concentration returning high RPDs, which are not necessarily significant when reviewed in light of potential contamination.

The adequacy of the laboratory QA/QC program is assessed against data quality indicators, as provided by the NSW DECCW.

9.2 Blind Replicate Summary

The blind replicate result for the soil samples indicated that 28 of the 32 RPDs were within or below the recommended guideline limits of 30 to 50% specified in the Australian Standard AS 4482.1-2005 as found in Table 8 below:

Table 8: Blind Replicate Sample Analysis and RPD Calculation

Original Sample	Replicate Sample	Analysis	Results
TP06-0.5m	BR01 (18/06/2010)	TPH, BTEX, metals, and PAHs	88% were within acceptable limits

10. Conclusions, Recommendations and Limitations

10.1 Conclusions

The results of this SCI indicate that parts of the site were previously a bitumen car park. Soil sampling results indicate the targeted areas of soil of the land located at Bank Street, Pyrmont NSW do not comply with the adopted SILs for the proposed use as a public boat ramp.

As such, the soils of the site which were investigated as part of this SCI are not considered suitable for use in construction of the boat ramp.

10.2 Recommendations

The following should be undertaken as part of the redevelopment:

- Soil should be excavated and stockpiled according to visual similarities (i.e. road-base stockpiled with road-base, bitumen with bitumen, sand fill with sand fill etc).
- As part of the excavation works, building/demolition rubble should be removed to the extent practical and separately stockpiled.
- Each stockpile should then be visually inspected and/or sampled according to the NSW DECCW *Waste Classification Guidelines*, 2008 and given a waste classification.
- If suspected clean stockpiles are developed, this material should be sampled and compared to the NSW DECCW *ENM Exemption*, 2008 criteria for potential beneficial reuse on the site.
- Material not able to be beneficially reused on the site should then be disposed off-site to a suitably licensed facility.

10.3 Limitations

The following limitation is made for this SCI conducted in the targeted areas of the site:

- This SCI is not intended to constitute a DESA to NSW DECCW guidelines.

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Appendix A: Site Locality Map

Images courtesy of www.googlemaps.com, 2010

Date: June 2010	Client: SP0062	Job: 82962
Site: Bank Street, Pyrmont NSW	Appendix A: Site Locality Map	

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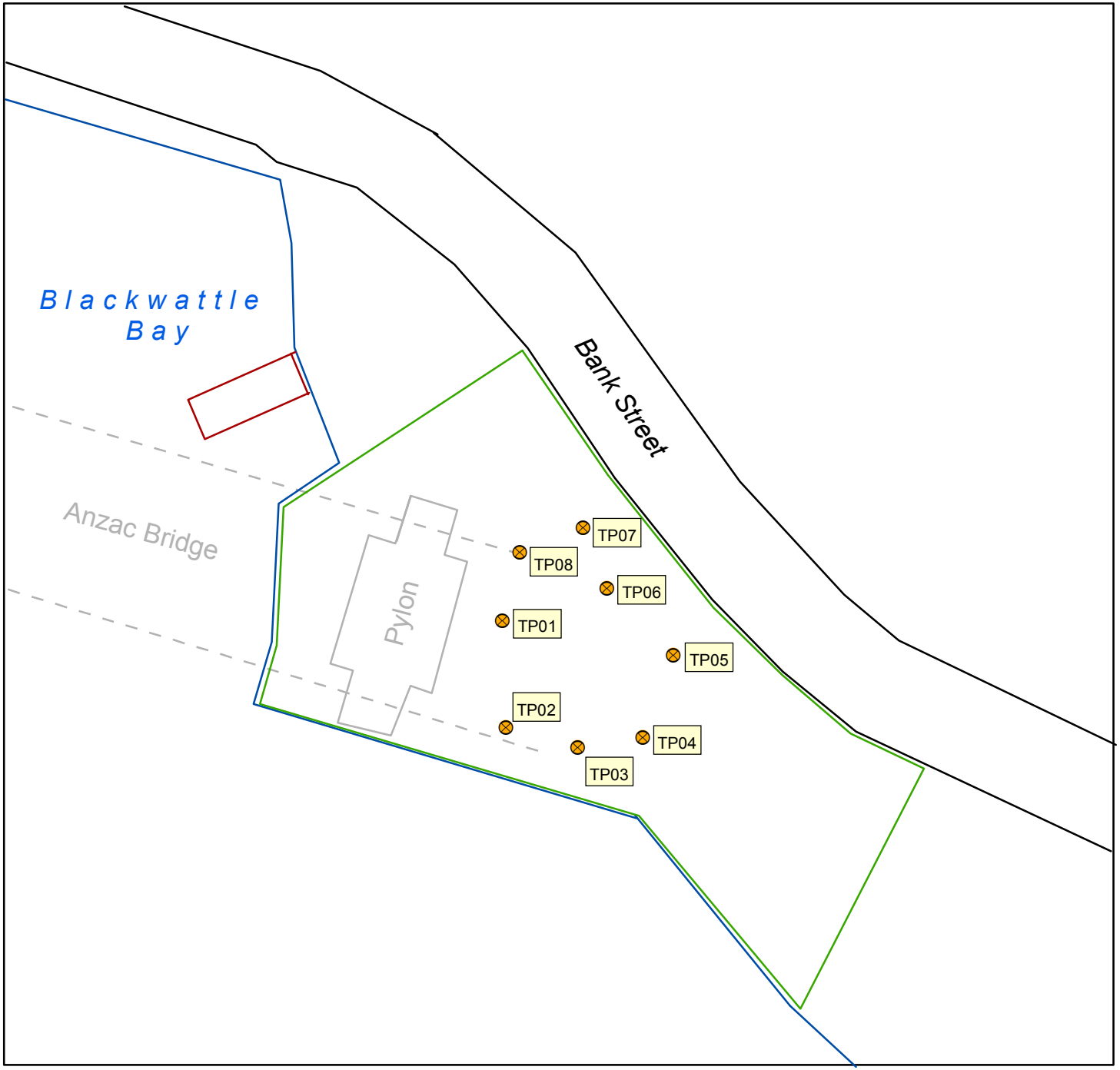
Appendix B: Site Layout Diagram with Test Pit Location



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Legend

- Test Pit Location
- Road
- Water Boundary
- Property Boundary
- Boat Shed

N

0 10 20 30 40 50 Meters

Approximate scale

Client Name:	Department of Public Works		
Client No:	SP0062	Job No:	82962
Project:	Soil Contamination Investigation		
Site:	Vacant land adjacent Bank St, Pyrmont		
Figure Name:	Test Pit Locations		
Figure No:	01	Date:	25/06/2010
Drafted By:	HG	Reviewed By:	NP
Coord System:	N/A		

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Appendix C: NSW DECCW Contaminated Land Database Search

Site and notice details

Your search for: Notice No. or Area No.: notice on site were matched.

Return to list of search results | Search Again | Refine Search

Area No: 3063

The information below was correct at the time the notices were issued.

Site: Pyrmont Power Station
Address: Pyrmont Road, Pyrmont, 2009
LGA: Sydney City Council

Occupier: Pacific Power

Lot 121 DP 828957 Lot 122 DP 828957

Notices relating to this site (0 current and 7 former)

(Map) where available, maps show the part of the site affected by the notice

Notice recipient	Notice type & number		Status	Date
Pacific Power	EHC Act Revocation Notice	379	Former	Issued 13 May 1994
Pacific Power	Section 35 EHC Act Order	370	Former	Issued 11 Jan 1994 Revoked 13 May 1994
Electricity Commission of NSW	Section 35 EHC Act Order Map	200	Former	Issued 13 Feb 1991 Revoked 13 May 1994
Electricity Commission of NSW	Section 35 EHC Act Order	167	Former	Issued 27 Apr 1990 Revoked 13 May 1994
Electricity Commission of NSW	Section 35 EHC Act Order	166	Former	Issued 17 Apr 1990 Revoked 13 May 1994
Electricity Commission of NSW	Section 35 EHC Act Order	139	Former	Issued 27 Jun 1989 Revoked 13 May 1994
Electricity Commission of NSW	Section 35 EHC Act Order	129	Former	Issued 03 May 1989 Revoked 13 May 1994

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Courtesy NSW DECCW Website, 2010

Date: June 2010	Client: SP0062	Job: 82962
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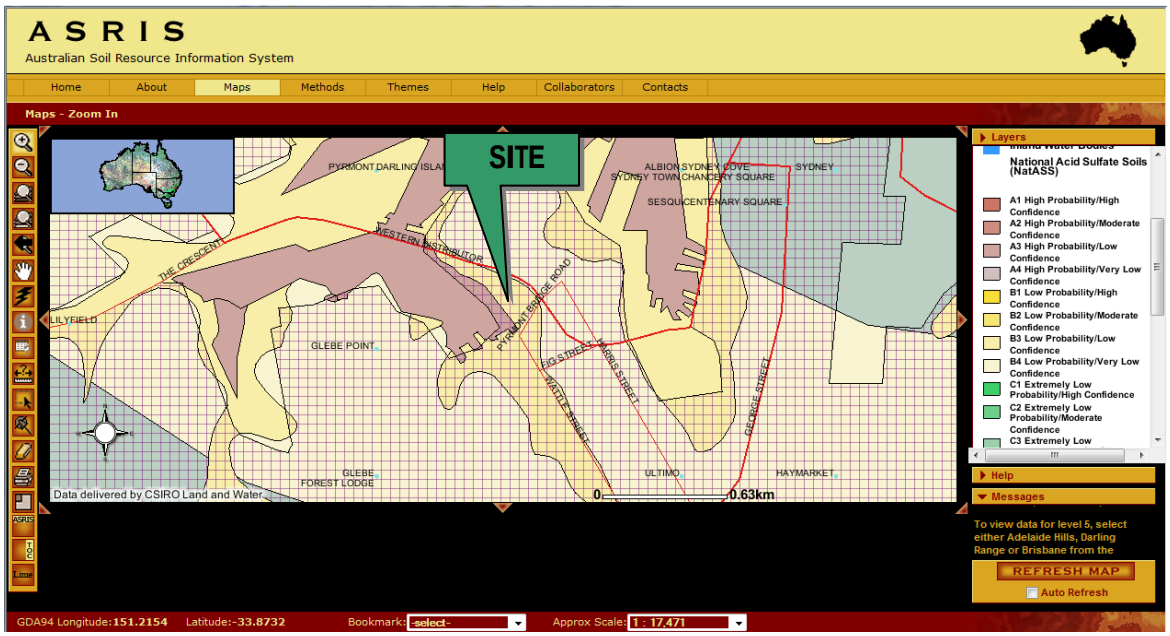
Appendix D: Acid Sulfate Soils Map



Courtesy ASRIS Website, 2010

Date: June 2010	Client: SP0062	Job: 82962
Site: Bank Street, Pyrmont NSW	Appendix D: Acid Sulfate Soils	

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Appendix E: NAA Sampling Methodology

Site Sampling Procedures

The following sampling protocol and procedures are adopted when undertaking contaminated site investigations. These procedures form the basis of the site assessment program, however variations may be required to suit site-specific requirements.

Soil Sampling

Sample Location and Identification

Samples were collected on a judgemental sampling protocol. All sample locations are indicated on site plans.

Each soil sample is labelled with the following information:

- ❑ Job number
- ❑ Job name
- ❑ Client Number
- ❑ Sampler's initials
- ❑ Date of sampling
- ❑ Sample Location Number
- ❑ Sample Number
- ❑ Sample Depth

Soil samples are normally recovered over a range of depths. At each sample depth, the following containers are used to contain the soil sample:

- ❑ A 250mL glass jar (laboratory prepared) with screw Teflon-coated lid; and

Soil Sampling Program

Excavator

A two-tonne excavator was used for test-pitting activities. Samples were collected directly from the test pit at the desired depth with a hand trowel.

Soil Sampling

Subsequent to the recovery of soil from the excavator a hand trowel was then used to transfer the soil sample to the glass jar. Disposable nitrile gloves are used to prevent cross contamination.

All samples are stored in ice chests whilst on site and during transportation to the laboratory.

Completion of Works

The test pits are backfilled and compacted with spoil subsequent to completion of sampling works.

Cleaning

All sampling equipment is cleaned prior to sampling and between sampling events to prevent cross contamination. This procedure consists of the following:

- ❑ Wash and brush scrubbing with laboratory grade detergent;
- ❑ Rinse with tap water; &
- ❑ Rinse with de-ionised water.

All cleaning is performed on a clean surface.

Laboratory Testing

A NATA registered laboratory completed all soil analysis, and tests are performed in accordance with the laboratory's NATA certificate and final laboratory reports shall bear the NATA stamp. Test methods used are recognised US EPA procedures set out by appropriate regulatory authorities.

The following tests/methodologies were carried out by Envirolab Services Pty Ltd:

Analyte	Laboratory Test Methodology	NATA Accredited
Envirolab Services Pty Ltd		
TPH (C_6-C_9)	GC.16 – Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.	Yes
TPH (C_{10}-C_{36})	GC.3 – Soil samples are extracted with Dichloromethane / Acetone and waters with Dichloromethane and analysed by GC-FID.	Yes
BTEX	GC.16 – Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.	Yes
PAHs	GC.12 – Soil samples are extracted with dichloromethane / acetone and analysed by GC-MS.	Yes
Heavy Metals	Metals.20 – Determination of various metals by ICP - AES. Metals 21 – Determination of mercury by cold vapour AAS.	Yes

Sampling Team

Nick Passlow, Managing Environmental Consultant of NAA, completed the sampling.

Record Keeping

Sampling locations are identified on the site plans. All sample locations are labelled by a reference number. A record is kept of all sampling locations. Additional sampling locations or areas of contamination noted during the investigation are indicated on the site plan.

Sub-surface conditions encountered at sample bore sites were recorded on site. All observed features and soil profiles are described and referred in terms of depth from the surface and thickness of layer.

Chain-of-custody documentation was prepared by the site consultant prior to delivery of the samples to the laboratory. Information recorded in the chain-of-custody form includes:

- ❑ Job name and number
- ❑ Person receiving samples
- ❑ Client name
- ❑ Laboratory address
- ❑ Date delivered to laboratory
- ❑ Sample type
- ❑ Date of sample collection
- ❑ Laboratory turn around time
- ❑ Sample location
- ❑ Person relinquishing samples
- ❑ Chemical analysis required
- ❑ Sample depth

Quality Control/ Quality Assurance

The following QA/QC procedures are adopted:

Laboratory Quality Control

QA/QC data provided by the laboratory typically includes, but is not limited to the following:

- ❑ **Matrix spikes** (performed once per process batch and at least 1 in 20 samples). They are used to document the precision and bias of a method in a given sample matrix and demonstrate the observance of false negatives in analytical data. The spike recovery procedure involves adding a known amount of reagent to a clean soil sample, which is subsequently tested. The purpose of this test is to verify the absence of matrix effects and other interferences. Recovery data is compared against acceptance criteria published in the Standard Methods for Examination of Water and Waste Water, or appropriate U.S. EPA Methods. If recoveries fall outside these criteria, the analyses are discontinued and the problem rectified.

- **Laboratory control samples** (performed once per process batch and at least 1 in 20 samples). These samples are prepared from a source independent of the calibration standards to confirm calibration validity.
- **Laboratory duplicates** (performed once per process batch and at least 1 in 10 samples). Analysis of duplicate samples is undertaken to assess the reputability of the laboratory analysis. Duplicate samples are made by thoroughly mixing a single soil sample, then coning and quartering it to form two duplicate samples. The repeatability of the analytical method is measured by calculating the relative percent difference (RPD) between the results for each duplicate sample. Should the RPD for the duplicate sample results exceed the control limit, the analysis is repeated.
- **Method blanks** (performed once per process batch and at least 1 in 20 samples). Method blanks are used to monitor the purity of reagents and the overall procedural blank. A method blank is where the laboratory analyses a clean sandy soil sample. Since the sample is clean it is expected to show "less than detection" concentrations for the analytes involved. Unusual or abnormal results for method blanks are investigated and corrective action taken before analysis of any batch is completed.

Results:

Summary: The majority of QA/QC data such as spike recoveries, duplicates and blanks were within acceptance criteria. Results of QA/QC data are included at the rear of the certified laboratory results. Further details on laboratory QA/QC (such as statistical review, calibrations etc) can be supplied upon request from the laboratory.

Data Quality Indicators

Completeness

Location of samples were determined following a site inspection and located upon a judgementally based sampling pattern within the area of investigation. An experienced staff member was utilised for all sampling to ensure sampling methodologies were utilised and implemented.

Comparability

The standard operating procedures adopted for the project were used throughout all field works, ensuring that all samples were taken in the same manner. An experienced field staff member was on-site at all times to ensure that sampling methodology were utilised and implemented.

Representativeness

Sampling was undertaken at various depths from each borehole to best enable investigation of the soil/fill material of the Site.

Precision

Standard operating procedures were employed throughout the project to minimise variation during the sampling process. NAA Environmental Work Instruction EWI04 "Soil Sample Collection" was followed throughout the project.

Accuracy

Standard operating procedures were employed throughout the project to ensure that field procedures minimised the potential of contaminant loss or cross contamination of samples, rendering the reported results inaccurate.

Overall Assessment

Based on an assessment of field based procedures and sampling methodologies the reported analytical results are considered to be valid and representative of contaminant concentrations at the sample locations tested.

Soil Contamination Investigation

NSW Public Works

Bank Street, Pyrmont NSW

Appendix F: Tabulated Analysis Results and QA/QC Tables

Report:	**Soil Contamination Investigation**		
Site Name:	**Vacant land**		
Site Address:	**Bank Street, Pyrmont**		
Client Name:	**Department of Public Works**		
Client Number:	**SP0062**	**Job Number:**	**82962**

Soil Contamination Investigation	Heavy Metals (mg/kg)							
	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Mercury (Hg)	Nickel (Ni)	Zinc (Zn)
Column 3: Parks, recreational, open space	200	40	200	2000	600	30	600	14000
Soil Sample ID								
TP01-0.2m	<4	<0.5	8	9	23	<0.1	5	45
TP02-0.5m	6	<0.5	7	54	96	0.2	9	91
TP03-0.6m	8	<0.5	8	45	89	1.2	7	130
TP04-0.1m	<4	<0.5	23	13	110	<0.1	6	96
TP05-0.4m	<4	<0.5	3	39	21	<0.1	8	51
TP06-0.5m	13	<0.5	4	46	97	<0.1	11	92
TP07-0.3m	<4	<0.5	11	27	61	<0.1	11	100
TP08-0.3m	<4	<0.5	3	16	39	<0.1	5	170
BR01	6	<0.5	4	24	80	<0.1	7	55

Soil Contamination Investigation	PAH (mg/kg)		VOCs (mg/kg)	Asbestos
	Benzo (a) Pyrene	Total PAH	Total VOCs	
Column 4: Commercial or Industrial	2	40		-
Soil Sample ID				
TP01-0.2m	0.2	2.7	<PQL	NA
TP02-0.5m	1.3	13.3	<PQL	NAD
TP03-0.6m	7.5	79	<PQL	NA
TP04-0.1m	0.3	3.1	<PQL	NAD
TP05-0.4m	41	362.6	<PQL	NA
TP06-0.5m	22	216.8	<PQL	NAD
TP07-0.3m	34	333.3	<PQL	NA
TP08-0.3m	19	189.3	<PQL	NAD
BR01	21	216.5	<PQL	NA

Soil Contamination Investigation	TPH (mg/kg)					BTEX (mg/kg)			
	C10-C14	C15-C28	C29-C36	Total (C10-C36)	C6-C9	Benzene	Toluene	Ethyl Benzene	Xylene
Service Station Guidelines		-		1000	65	1	130	50	25
Soil Sample ID									
TP01-0.2m	<50	<100	<100	<100	<25	<0.5	<0.5	<1.0	<1.0
TP02-0.5m	<50	<100	<100	<100	<25	<0.5	<0.5	<1.0	<1.0
TP03-0.6m	<50	140	100	290	<25	<0.5	<0.5	<1.0	<1.0
TP04-0.1m	<50	<100	<100	<100	<25	<0.5	<0.5	<1.0	<1.0
TP05-0.4m	<50	480	580	1110	<25	<0.5	<0.5	<1.0	<1.0
TP06-0.5m	<50	330	260	640	<25	<0.5	<0.5	<1.0	<1.0
TP07-0.3m	<50	520	470	1040	<25	<0.5	<0.5	<1.0	<1.0
TP08-0.3m	<50	300	280	630	<25	<0.5	<0.5	<1.0	<1.0
BR01	<50	330	280	660	<25	<0.5	<0.5	<1.0	<1.0

"Column 4: Commercial or Industrial" Criteria adapted from NSW DECC Guidelines for the NSW Site Auditor Scheme 2nd Edition, 2006	
Note: "PQL" = Practical Quantitation Limit	

	Indicates "Complies With Site Criteria"
	Indicates "Exceeds Site Criteria"

Report:	**Soil Contamination Investigation**		
Site Name:	**Vacant land**		
Site Address:	**Bank Street, Pyrmont**		
Client Name:	**Department of Public Works**		
Client Number:	**SP0062**	**Job Number:**	**82962**

Data Evaluation			
Total QA/QC Samples	33	Percentage of Acceptable Results	100%
Acceptable QA/QC Samples	33		

Soil Contamination Investigation	Heavy Metals (mg/kg)								TPH (mg/kg)				BTEX (mg/kg)				
	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	C6-C9	C10-C14	C15-C28	C29-C36	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene
Soil Sample ID																	
TP06-0.5m	13	0.5	4	46	97	0.1	11	92	25	50	330	260	0.5	0.5	1	2	1
BR-01 (18/06/2010)	6	0.5	4	24	80	0.1	7	55	25	50	330	280	0.5	0.5	1	2	1
% RPD	**74%**	0%	0%	**63%**	19%	0%	44%	**50%**	0%	0%	0%	7%	0%	0%	0%	0%	0%

Soil Contamination Investigation	PAH (ug/L)														
	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
Soil Sample ID															
TP06-0.5m	0.1	0.1	0.4	0.4	14	3	47	40	14	15	30	22	14	1.8	15
BR-01 (18/06/2010)	0.1	0.1	0.7	0.4	14	2.8	46	40	14	15	30	21	14	2.4	16
% RPD	0%	0%	**55%**	0%	0%	7%	2%	0%	0%	0%	0%	5%	0%	29%	6%

	Indicates "Within Acceptable %RPD"
	Indicates "Exceeds Acceptable %RPD"

Soil Contamination Investigation

NSW Public Works

Bank Street, Pyrmont NSW

Appendix G: NATA Certified Analysis Results

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

CERTIFICATE OF ANALYSIS 42367

Client:
Noel Arnold & Associates
Level 2, 11 Khartoum Rd
North Ryde
NSW 2113

Attention: Nick Passlow

Sample log in details:

Your Reference:	**82962-Pyrmont**
No. of samples:	9 Soils
Date samples received:	18/06/10
Date completed instructions received:	18/06/10

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by:	23/06/10
Date of Preliminary Report:	Not Issued
Issue Date:	23/06/10

NATA accreditation number 2901. This document shall not be reproduced except in full.
This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
Tests not covered by NATA are denoted with *.

Results Approved By:

Rhian Morgan
Metals Supervisor

Jacinta Hurst
Laboratory Manager

Nancy Zhang
Chemist

Matt Mansfield
Approved Signatory

ACCREDITED FOR TECHNICAL COMPETENCE

VOCs in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	42367-1 TP01 0.2 18/06/2010 Soil	42367-3 TP03 0.6 18/06/2010 Soil	42367-5 TP05 0.4 18/06/2010 Soil	42367-7 TP07 0.3 18/06/2010 Soil
Date extracted	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	22/06/2010	22/06/2010	22/06/2010	22/06/2010
Dichlorodifluoromethane	mg/kg	<1.0	<1.0	<1.0	<1.0
Chloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	mg/kg	<1.0	<1.0	<1.0	<1.0
Bromomethane	mg/kg	<1.0	<1.0	<1.0	<1.0
Chloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	mg/kg	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,1-dichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0
bromochloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0
chloroform	mg/kg	<1.0	<1.0	<1.0	<1.0
2,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2-dichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0
1,1,1-trichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0
1,1-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0
Cyclohexane	mg/kg	<1.0	<1.0	<1.0	<1.0
carbon tetrachloride	mg/kg	<1.0	<1.0	<1.0	<1.0
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5
dibromomethane	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0
trichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0
bromodichloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0
trans-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0
cis-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,1,2-trichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0
dibromochloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2-dibromoethane	mg/kg	<1.0	<1.0	<1.0	<1.0
tetrachloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,1,1,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0
chlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
bromoform	mg/kg	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0
styrene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0

VOCs in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	42367-1 TP01 0.2 18/06/2010 Soil	42367-3 TP03 0.6 18/06/2010 Soil	42367-5 TP05 0.4 18/06/2010 Soil	42367-7 TP07 0.3 18/06/2010 Soil
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2,3-trichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0
isopropylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
bromobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
n-propyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0
2-chlorotoluene	mg/kg	<1.0	<1.0	<1.0	<1.0
4-chlorotoluene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,3,5-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0
tert-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2,4-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,3-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
sec-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,4-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
4-isopropyl toluene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
n-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2-dibromo-3-chloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2,4-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
hexachlorobutadiene	mg/kg	<1.0	<1.0	<1.0	<1.0
1,2,3-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluorometha	%	77	74	72	71
Surrogate aaa-Trifluorotoluene	%	121	119	117	118
Surrogate Toluene-d_8	%	102	107	106	104
Surrogate 4-Bromofluorobenzene	%	85	85	84	87

vTPH & BTEX in Soil						
Our Reference:	UNITS	42367-1	42367-2	42367-3	42367-4	42367-5
Your Reference	----------	TP01	TP02	TP03	TP04	TP05
Depth	----------	0.2	0.5	0.6	0.1	0.4
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	22/06/2010	22/06/2010	22/06/2010	22/06/2010	22/06/2010
vTPH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	121	118	119	111	117

vTPH & BTEX in Soil					
Our Reference:	UNITS	42367-6	42367-7	42367-8	42367-9
Your Reference	----------	TP06	TP07	TP08	BR01
Depth	----------	0.5	0.3	0.3	-
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	22/06/2010	22/06/2010	22/06/2010	22/06/2010
vTPH C_6 - C_9	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	95	118	100	100

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	42367-1	42367-2	42367-3	42367-4	42367-5
Your Reference	----------	TP01	TP02	TP03	TP04	TP05
Depth	----------	0.2	0.5	0.6	0.1	0.4
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010	21/06/2010
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	140	<100	480
TPH C_{29} - C_{36}	mg/kg	<100	<100	100	<100	580
Surrogate o-Terphenyl	%	96	90	100	93	101

sTPH in Soil (C10-C36)					
Our Reference:	UNITS	42367-6	42367-7	42367-8	42367-9
Your Reference	----------	TP06	TP07	TP08	BR01
Depth	----------	0.5	0.3	0.3	-
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	330	520	300	330
TPH C_{29} - C_{36}	mg/kg	260	470	280	280
Surrogate o-Terphenyl	%	99	101	98	98

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	42367-1 TP01 0.2 18/06/2010 Soil	42367-2 TP02 0.5 18/06/2010 Soil	42367-3 TP03 0.6 18/06/2010 Soil	42367-4 TP04 0.1 18/06/2010 Soil	42367-5 TP05 0.4 18/06/2010 Soil
Date extracted	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	22/06/2010	22/06/2010	22/06/2010	22/06/2010	22/06/2010
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	<0.1	0.2	<0.1	0.9
Fluorene	mg/kg	<0.1	<0.1	0.2	<0.1	0.5
Phenanthrene	mg/kg	<0.1	0.5	5.2	0.2	18
Anthracene	mg/kg	<0.1	0.1	1.3	<0.1	4.0
Fluoranthene	mg/kg	0.3	2.4	17	0.4	75
Pyrene	mg/kg	0.3	2.2	15	0.4	66
Benzo(a)anthracene	mg/kg	0.2	1.0	6.1	0.2	25
Chrysene	mg/kg	0.2	1	5.6	0.2	22
Benzo(b+k)fluoranthene	mg/kg	0.4	2.2	11	0.4	54
Benzo(a)pyrene	mg/kg	0.2	1.3	7.5	0.3	41
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	1	4.6	0.2	24
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	0.5	<0.1	3.0
Benzo(g,h,i)perylene	mg/kg	0.2	1.0	4.6	0.2	29
Surrogate p-Terphenyl-d_{14}	%	103	107	101	107	106

PAHs in Soil					
Our Reference:	UNITS	42367-6	42367-7	42367-8	42367-9
Your Reference	----------	TP06	TP07	TP08	BR01
Depth	----------	0.5	0.3	0.3	-
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	22/06/2010	22/06/2010	22/06/2010	22/06/2010
Naphthalene	mg/kg	<0.1	0.3	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.1	0.1	<0.1
Acenaphthene	mg/kg	0.4	2.4	0.3	0.7
Fluorene	mg/kg	0.4	2.0	0.2	0.4
Phenanthrene	mg/kg	14	36	7.1	14
Anthracene	mg/kg	3.0	8.5	1.8	2.8
Fluoranthene	mg/kg	47	69	40	46
Pyrene	mg/kg	40	63	37	40
Benzo(a)anthracene	mg/kg	14	24	14	14
Chrysene	mg/kg	15	24	14	15
Benzo(b+k)fluoranthene	mg/kg	30	47	29	30
Benzo(a)pyrene	mg/kg	22	34	19	21
Indeno(1,2,3-c,d)pyrene	mg/kg	14	20	12	14
Dibenzo(a,h)anthracene	mg/kg	1.8	3.0	1.7	2.4
Benzo(g,h,i)perylene	mg/kg	15	21	13	16
Surrogate p-Terphenyl-d_{14}	%	100	102	106	106

Acid Extractable metals in soil						
Our Reference:	UNITS	42367-1	42367-2	42367-3	42367-4	42367-5
Your Reference	----------	TP01	TP02	TP03	TP04	TP05
Depth	----------	0.2	0.5	0.6	0.1	0.4
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Arsenic	mg/kg	<4	6	8	<4	<4
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	8	7	8	23	3
Copper	mg/kg	9	54	45	13	39
Lead	mg/kg	23	96	89	110	21
Mercury	mg/kg	<0.1	0.2	1.2	<0.1	<0.1
Nickel	mg/kg	5	9	7	6	8
Zinc	mg/kg	45	91	130	96	51

Acid Extractable metals in soil					
Our Reference:	UNITS	42367-6	42367-7	42367-8	42367-9
Your Reference	----------	TP06	TP07	TP08	BR01
Depth	----------	0.5	0.3	0.3	-
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date digested	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Date analysed	-	21/06/2010	21/06/2010	21/06/2010	21/06/2010
Arsenic	mg/kg	13	<4	<4	6
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	4	11	3	4
Copper	mg/kg	46	27	16	24
Lead	mg/kg	97	61	39	80
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	11	11	5	7
Zinc	mg/kg	92	100	170	55

Miscellaneous Inorg - soil						
Our Reference:	UNITS	42367-1	42367-2	42367-3	42367-4	42367-5
Your Reference	----------	TP01	TP02	TP03	TP04	TP05
Depth	----------	0.2	0.5	0.6	0.1	0.4
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010	21/6/2010
Date analysed	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010	21/6/2010
pH 1:5 soil:water	pH Units	8.1	8.6	8.0	9.4	6.4
Electrical Conductivity 1:5 soil:water	µS/cm	310	250	2,200	990	2,300

Miscellaneous Inorg - soil					
Our Reference:	UNITS	42367-6	42367-7	42367-8	42367-9
Your Reference	----------	TP06	TP07	TP08	BR01
Depth	----------	0.5	0.3	0.3	-
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010
Date analysed	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010
pH 1:5 soil:water	pH Units	6.7	7.8	7.7	7.9
Electrical Conductivity 1:5 soil:water	µS/cm	2,300	1,700	2,100	2,200

Moisture						
Our Reference:	UNITS	42367-1	42367-2	42367-3	42367-4	42367-5
Your Reference	----------	TP01	TP02	TP03	TP04	TP05
Depth	----------	0.2	0.5	0.6	0.1	0.4
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010	21/6/2010
Date analysed	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010	21/6/2010
Moisture	%	5.2	7.6	8.3	5.0	10

Moisture					
Our Reference:	UNITS	42367-6	42367-7	42367-8	42367-9
Your Reference	----------	TP06	TP07	TP08	BR01
Depth	----------	0.5	0.3	0.3	-
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010
Date analysed	-	21/6/2010	21/6/2010	21/6/2010	21/6/2010
Moisture	%	8.5	7.2	9.9	6.7

Asbestos ID - soils					
Our Reference:	UNITS	42367-2	42367-4	42367-6	42367-8
Your Reference	----------	TP02	TP04	TP06	TP08
Depth	----------	0.5	0.1	0.5	0.3
Date Sampled		18/06/2010	18/06/2010	18/06/2010	18/06/2010
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	22/6/2010	22/6/2010	22/6/2010	22/6/2010
Sample Description	-	Approx 40g Soil	Approx 40g Soil	Approx 40g Soil	Approx 40g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Method ID	Methodology Summary
GC.14	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
GC.16	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.
GC.3	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
GC.12 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
Metals.21 CV-AAS	Determination of Mercury by Cold Vapour AAS.
LAB.1	pH - Measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+.
LAB.2	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA2510 20th ED and Rayment & Higginson.
LAB.8	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
ASB.1	Asbestos ID - Qualitative identification of asbestos type fibres in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques.

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/06/2010	[NT]	[NT]	LCS-2	21/06/2010
Date analysed	-			22/06/2010	[NT]	[NT]	LCS-2	22/06/2010
Dichlorodifluoromethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Chloromethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Bromomethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Chloroethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	105%
cis-1,2-dichloroethene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
bromochloromethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
chloroform	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	111%
2,2-dichloropropane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	111%
1,1,1-trichloroethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	119%
1,1-dichloropropene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Cyclohexane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
carbon tetrachloride	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Benzene	mg/kg	0.5	GC.14	<0.5	[NT]	[NT]	[NR]	[NR]
dibromomethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
trichloroethene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	115%
bromodichloromethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	114%
trans-1,3-dichloropropene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Toluene	mg/kg	0.5	GC.14	<0.5	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
dibromochloromethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	107%
1,2-dibromoethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
tetrachloroethene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	LCS-2	117%
1,1,1,2-tetrachloroethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
chlorobenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
bromoform	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
m+p-xylene	mg/kg	2	GC.14	<2.0	[NT]	[NT]	[NR]	[NR]
styrene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
o-Xylene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
isopropylbenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
bromobenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
tert-butyl benzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
sec-butyl benzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
hexachlorobutadiene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	1	GC.14	<1.0	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluorometha	%		GC.14	91	[NT]	[NT]	LCS-2	98%
Surrogate aaa-Trifluorotoluene	%		GC.14	122	[NT]	[NT]	LCS-2	108%
Surrogate Toluene-d_8	%		GC.14	99	[NT]	[NT]	LCS-2	99%
Surrogate 4-Bromofluorobenzene	%		GC.14	90	[NT]	[NT]	LCS-2	94%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/06/2010	[NT]	[NT]	LCS-2	21/06/2010
Date analysed	-			22/06/2010	[NT]	[NT]	LCS-2	22/06/2010
vTPH C_6 - C_9	mg/kg	25	GC.16	<25	[NT]	[NT]	LCS-2	98%
Benzene	mg/kg	0.5	GC.16	<0.5	[NT]	[NT]	LCS-2	88%
Toluene	mg/kg	0.5	GC.16	<0.5	[NT]	[NT]	LCS-2	105%
Ethylbenzene	mg/kg	1	GC.16	<1.0	[NT]	[NT]	LCS-2	97%
m+p-xylene	mg/kg	2	GC.16	<2.0	[NT]	[NT]	LCS-2	101%
o-Xylene	mg/kg	1	GC.16	<1.0	[NT]	[NT]	LCS-2	105%
Surrogate aaa-Trifluorotoluene	%		GC.16	122	[NT]	[NT]	LCS-2	105%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/06/2010	[NT]	[NT]	LCS-3	21/06/2010
Date analysed	-			21/06/2010	[NT]	[NT]	LCS-3	21/06/2010
TPH C_{10} - C_{14}	mg/kg	50	GC.3	<50	[NT]	[NT]	LCS-3	88%
TPH C_{15} - C_{28}	mg/kg	100	GC.3	<100	[NT]	[NT]	LCS-3	99%
TPH C_{29} - C_{36}	mg/kg	100	GC.3	<100	[NT]	[NT]	LCS-3	99%
Surrogate o-Terphenyl	%		GC.3	83	[NT]	[NT]	LCS-3	90%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/06/2010	[NT]	[NT]	LCS-3	21/06/2010
Date analysed	-			22/06/2010	[NT]	[NT]	LCS-3	22/06/2010
Naphthalene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	LCS-3	91%
Acenaphthylene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	LCS-3	89%
Phenanthrene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	LCS-3	94%
Anthracene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	LCS-3	90%
Pyrene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	LCS-3	96%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)anthracene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	LCS-3	100%
Benzo(b+k)fluoranthene	mg/kg	0.2	GC.12 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12 subset	<0.05	[NT]	[NT]	LCS-3	110%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		GC.12 subset	108	[NT]	[NT]	LCS-3	102%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			21/06/2010	[NT]	[NT]	LCS-1	21/06/2010
Date analysed	-			21/06/2010	[NT]	[NT]	LCS-1	21/06/2010
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4	[NT]	[NT]	LCS-1	101%
Cadmium	mg/kg	0.5	Metals.20 ICP-AES	<0.5	[NT]	[NT]	LCS-1	100%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Copper	mg/kg	1	Metals.20 ICP-AES	<1	[NT]	[NT]	LCS-1	105%
Lead	mg/kg	1	Metals.20 ICP-AES	<1	[NT]	[NT]	LCS-1	102%
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.1	[NT]	[NT]	LCS-1	102%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Zinc	mg/kg	1	Metals.20 ICP-AES	<1	[NT]	[NT]	LCS-1	104%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			21/06/2010	42367-7	21/6/2010 || 21/6/2010	LCS-1	21/06/2010
Date analysed	-			21/06/2010	42367-7	21/6/2010 || 21/6/2010	LCS-1	21/06/2010
pH 1:5 soil:water	pH Units		LAB.1	[NT]	42367-7	7.8 || 7.7 || RPD: 1	LCS-1	100%
Electrical Conductivity 1:5 soil:water	µS/cm	1	LAB.2	<1.0	42367-7	1700 || 1800 || RPD: 6	LCS-1	99%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			21/6/2010
Date analysed	-			21/6/2010
Moisture	%	0.1	LAB.8	<0.10

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

Report Comments:

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample.
Envirolab recommends supplying 30-40g of sample in it's own container.
Asbestos was analysed by Approved Identifier: Matt Mansfield
Asbestos was authorised by Approved Signatory: Matt Mansfield
INS: Insufficient sample for this test NT: Not tested PQL: Practical Quantitation Limit <: Less than >: Greater than
RPD: Relative Percent Difference NA: Test not required LCS: Laboratory Control Sample NR: Not requested

Quality Control Definitions

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

Laboratory Acceptance Criteria:

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable. Surrogates: 60-140% is acceptable for general organics and 10-140% for