

9 December 2014

Our ref: ENAURHOD01060AA-L01e

Leighton Fulton Hogan Joint Venture (Sapphire to Woolgoolga)
Level 1, 9 Market Street
Woolgoolga, NSW 2456

Attention: Ian Chaffey

Dear Ian

Review (ENM & HIL-F) Unsuitable Material Sapphire to Woolgoolga Upgrade - Analytical Data Opinion and Compliance Validation

1. Executive Summary

As described below Coffey have undertaken a review of analytical results provided by the Leighton Fulton Hogan Joint Venture (Sapphire to Woolgoolga) on 10 sites where unsuitable materials were placed on RMS owned land. Coffey were requested to assess the analytical results against Table 2 of the Excavated Natural Material (ENM) Exemption 2012 for eight (8) sites as described below and against the National Environmental Protection Measure Assessment of Site Contamination (1999) HIL-F for two (2) other sites.

Based on the analytical data reviewed, Coffey consider:

- The analytical results reviewed for Cut 28 and Cut 35 comply with the NEPM ASC (1999) HIL-F criteria.
- The analytical results reviewed for the other eight (8) unsuitable materials sites (Banana Shed South, Mountain Way, Gaudrons / Rob Rae, Sugamill, McCues, Hearn's Lake, Cut 21 and Cut 29) generally complies with the relevant concentrations for ENM Exemption 2012, although there are eleven (11) exceedances of the absolute maximum concentrations noted in this review.

As discussed in this review five (5) of those are related to arsenic in samples from the base of unsuitable material at the Mountain Way site. Based on results of subsequent additional investigations elevated arsenic concentrations were only identified in the mixing and interface layers at the base of the fill and are likely to be sourced from arsenic contamination at the surface of the residual soils, consistent with the behaviour of arsenic residues on former banana lands.

Coffey note that the ENM Exemption was established to enable soils with a low risk of soil contamination to be beneficially reused as a resource at sites other than the source site. As such, soils meeting the ENM chemical criteria are generally regarded as having a low likelihood of contamination.

Coffey's review of data exceedances of the absolute maximum concentrations in the ENM Exemption 2012 indicates the total concentrations measured are predominantly significantly below the current amended NEPM ASC (1999 as amended 2013) health criteria for the most sensitive residential land use (HIL-A). Overall, the analytical results show little evidence of significant contamination and the relatively low concentrations of contaminants indicate the results are likely to be consistent with natural background levels in the area of the S2W project.

2. Introduction

Leighton Fulton Hogan Joint Venture (Sapphire to Woolgoolga) (LFHJV) were contracted by Roads and Maritime Services (RMS) to construct the Sapphire to Woolgoolga Upgrade (S2W), part of the overall Pacific Highway Upgrade.

The construction is complete and the S2W road is operational. We understand that prior to being released from the project by RMS, LFHJV are required finalise a number of matters. These include confirming that surplus unsuitable material that has been placed on RMS owned land by LFHJV is not contaminated.

Coffey Environments (Coffey) were engaged by LFHJV to undertake a review of information provided by LFHJV in relation to the quality of unsuitable material at 10 RMS owned sites within the S2W project corridor.

3. Background

We understand the S2W upgrade consisted of:

- A new southern section, 15 km dual carriageway, between Sapphire and South Woolgoolga largely within the existing highway corridor.
- A new 'greenfield' northern section, 10 km bypass from South Woolgoolga to the west of Woolgoolga which rejoins the existing highway alignment in the vicinity of Arrawarra Beach Road.

A significant S2W project activity was the excavation, storage and management of excavated materials which were proposed to be beneficially re-used as much as possible. Material that was suitable for beneficial reuse for engineering purposes was termed suitable material; while material that did not meet engineering specifications was termed to be unsuitable material and was not to be used beneficially for engineering purposes. Unsuitable material was to be placed in permanent locations within the road corridor or off site.

Due to a number of significant constraints including the size of the project, hilly terrain, land availability, tight road corridor, high rainfall, geotechnical conditions and the sensitive environment the management of unsuitable material has presented a significant challenge to the project. The requirement for placement locations for surplus unsuitable material far exceeded estimations prior to project commencement, primarily due to saturation of excavated material as a result of a period of a period of extremely wet weather. The high moisture content meant a significant quantity of the excavated material was classified as unsuitable material and could not be used for engineering purposes within the project.

We understand that the total volume of unsuitable material requiring management on the S2W project is 861,160m³ of 473,420m³ has been beneficially re-used. The remaining volume of 387,740m³ has been placed at 10 RMS sites as referred to as follows:

1. Banana Shed South
2. Mountain Way
3. Gaudrons / Rob Rae
4. Sugamill
5. McCues
6. Hearnese Lake
7. Cut 21
8. Cut 28
9. Cut 29
10. Cut 35

The approximate location of each of the sites is shown on Figure 1 attached at the rear of the text.

The material was to be beneficially reused to ensure that the local landform suits its proposed use or to improve the amenity alongside the project, and provide beneficial future re-use opportunities at each of the sites.

We understand that RMS owns each of these sites but following completion of construction they may wish to sell some or all of the properties. RMS requires the LFHJV to demonstrate that the unsuitable material placed at each site is not contaminated.

We understand that for Cuts 28 and 35 (where unsuitable material as placed early in the project) that RMS agreed with LFHJV that the unsuitable material should meet ASC NEPM HIL F quality¹; it is noted that the ASC NEPM (1999) was amended in 2013 and that in the amended ASC NEPM the commercial / industrial health investigation level is referred to as HIL-D. For the purposes of this report we assume HIL-F refers to the ASC NEPM (1999).

We understand that for all other sites of unsuitable material RMS has specified the material must be of a quality that meets the Excavated Natural Material (ENM) Exemption 2012² (dated 19 October 2012). LFHJV advised us that this was to be used in the review rather than the RMS obtained project specific ENM exemption titled "RMS Sapphire to Woolgoolga excavated natural material exemption 2011" (dated 1 December 2011). A copy of the ENM Exemption 2012 is included in Appendix A.

4. Scope of Work

It is agreed with LFHJV the scope of work for Coffey comprises the following:

- Review of the analytical results provided by the LFHJV and assessment of these against the list of analytical parameters and concentration requirements included in Table 2 of the ENM Exemption for eight (8) of the sites (Banana Shed South, Mountain Way, Gaudrons / Rob Rae, Sugamill, McCues, Hearn Lake, Cut 21 and Cut 29); and assessment of results for the two remaining sites (Cut 28 and Cut 35) against the ASC NEPM (1999) HIL-F.

As part of the scope of work a site visit was also undertaken by a Coffey Senior Principal to briefly observe the 10 sites and to be briefed by the LFHJV.

¹ The National Environment Protection Assessment of Site Contamination Measure (1999) included health investigation levels (HILs) for a range of different land uses. Health investigation levels include:

- A. 'Standard' residential with garden/accessible soil (home-grown produce contributing less than 10% of vegetable and fruit intake; no poultry): this category includes children's day-care centres, kindergartens, preschools and primary schools.
- B. Residential with substantial vegetable garden (contributing 10% or more of vegetable and fruit intake) and/or poultry providing any egg or poultry meat dietary intake.
- C. Residential with substantial vegetable garden (contributing 10% or more of vegetable and fruit intake); poultry excluded.
- D. Residential with minimal opportunities for soil access: includes dwellings with fully and permanently paved yard space such as high-rise apartments and flats.
- E. Parks, recreational open space and playing fields: includes secondary schools.
- F. Commercial/Industrial: includes premises such as shops and offices as well as factories and industrial sites.

² Under the Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A. We note that the Excavated Natural Material Exemption 2012 has recently been replaced by the Excavated Natural Material Order 2014 which commenced 24 November 2014.

5. The Review

5.1. Information Provided by LFHJV

The information provided by the LFHJV for each site typically included the following:

- Plans - survey plans, survey sections and commonly a plan showing sampling locations (not for all locations)
- Test results in the form of a laboratory (EAL³) compiled summary tables of results (laboratory certificates were not provided). As well as including individual analytical results these summary tables included the following:
 - Minimum concentration;
 - Maximum concentration; and
 - Average concentration (presumably based on arithmetic average)⁴
- Geotechnical information when provided included soil compaction results.

5.2. Overview

When undertaking the review Coffey have relied on advice and information provided by LFHJV including the following:

- All unsuitable material was sourced from within the S2W project corridor with no imported materials being included within the unsuitable material;
- The unsuitable materials were applied to land as engineering fill or used in earthworks in each of the reuse situations;
- The unsuitable material was classified as Excavated Natural Material as defined in the Section 6 of ENM Exemption 2012 and has been excavated from the ground, contains at least 98% natural material and does not meet the definition of Virgin Excavated Natural Material and did not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulphate Soils (ASS), Potential Acid Sulphate Soils (PASS) or sulfidic ores;
- LFHJV undertook sampling and analysis of the material for Acid Sulphate Soil (ASS) and Potential Acid Sulphate Soil (PASS), as required in Section 8 of the ENM Exemption 2012;
- LFHJV undertook sampling of the unsuitable material was undertaken in general accordance with Australian Standard 1141.3.1-1996 Methods for sampling and testing aggregates – Sampling – Aggregates (or equivalent);
- LFHJV sampling, sampling preparation and storage met the requirements of Tables 3, 4 and 5 of the ENM Exemption 2012;
- Laboratory test methods met the requirement of Test Methods of the ENM Exemption 2012; and
- The excavated natural material was appropriately stored until the characterisation test results were validated.

³ EAL – Environmental analysis laboratory

⁴ The summary table indicated that “For statistical purposes, half detection limit replaced with samples NOT DETECTED”

Coffey have relied on the advice of LFHJV in respect of these matters.

We understand that for each sample batch provided the laboratory EAL commonly provided a cover letter and accompanying tabulated laboratory summary tables of analytical results for testing undertaken, including columns recording: minimum; maximum; and average concentrations. The cover letter normally included commentary on compliance of the results with the concentration for characterisation columns (Columns 2 and 3) in the ENM Exemption 2012. We also note that EAL have confirmed to LFHJV that analytical testing methods for all chemicals and other attributes are in accordance with the requirements of the ENM Exemption 2012. Laboratory certificates weren't reviewed as part of this study; we relied on laboratory summary tables.

It is noted that EAL subcontracted out analysis for organics to Envirolab and that in analytical reports it is noted that EAL indicate that NATA accreditation was not yet received for RTA T276 (for contaminants).

The focus of this review by Coffey has been:

1. For Cuts 28 and 35 assessing the chemical results provided by LFHJV against the relevant NEPM ASC (1999) HIL-F criteria;
2. For all other locations of unsuitable materials (Banana Shed South, Mountain Way, Gaudrons / Rob Rae, Sugamill, McCues, Hearn's Lake, Cut 21 and Cut 29) assessing:
 - a. The samples submitted to the analytical laboratory were analysed for the range of chemicals and other attributes listed in Column 1 of Table 2 of the ENM Exemption 2012;
 - b. Assessing the chemical results provided by LFHJV provided results against the concentration requirements in Table 2 of the ENM Exemption 2012 as follows:
 - i. The maximum average concentration (based on the arithmetic mean) complied with criteria listed in Column 2 of Table 2 of the ENM Exemption 2012 (see discussion below in relation to this point).
 - ii. The absolute maximum concentration or value listed in Column 3 of Table 3 (of the ENM Exemption 2012);

In relation to HIL-F compliance Coffey have assumed the analytical parameters tested met the requirements of the agreement between LFHJV and RMS and have simply made a comparison of results with the respective HIL-F requirements. In the instance of Total Recoverable Hydrocarbons (TRH) where the NEPM ASC (1999) does not include criteria we have used the commonly used Total Petroleum Hydrocarbons (TPH) criteria from the NSW EPA (1994) Guidelines for Assessing Service Station Sites (the 2013 amended NEPM ASC includes TRH criteria for a commercial industrial land use).

Coffey did not review all the minimum and maximum concentrations or calculate the maximum average concentration for test results but rather relied on the summary and calculations included in the EAL laboratory summary tables and assumed these had been completed in accordance with the ENM Exemption 2012 requirements. Coffey did some spot checks of the average calculations which confirmed results as tabulated by EAL.

Where multiple sources of unsuitable material were used to fill an individual location (e.g. Cut 29), we assessed whether the maximum average concentration (see previous paragraph) of each source met the ENM Exemption 2012 requirements (and did not calculate or assess the overall maximum average concentration for the location).

5.3. Results of the Review

A summary of the results of the review of Cuts 28 and 35 for compliance with the NEPM ASC HIL-F criteria are presented in Table 1 below.

TABLE 1: CUTS 28 AND 35 COMPLIANCE WITH NEPM HIL-F

Unsuitable Material Site	Analytical Results Compliance with NEPM ASC (1999) HIL-F criteria	Comments
Cut 28	Yes	-
Cut 35	Yes	-

A summary of the results for other unsuitable material locations for compliance with Table 2 of the ENM Exemption 2012 is presented in Table 2.

TABLE 2: OTHER UNSUITABLE MATERIAL LOCATIONS COMPLIANCE WITH TABLE 2 OF ENM EXEMPTION 2012

Site	Analytical Testing Complies with Column 1 of Table 2 ENM Exemption 2012	Analytical Results Comply with Table 2 of ENM Exemption 2012 ^a		Comments
		Maximum Average Concentration < Column 2	Absolute Maximum Concentration < Column 3	
Banana Shed South	Yes	Yes	Yes	-
Mountain Way	Yes	Yes	Yes except for arsenic in samples from base of TP22, BH5, BH7, BH33 and BH34	Additional sampling was undertaken at the base in the area of these locations with collection of samples from fill, fill/mixing layer, interface and natural. . All samples collected from fill were below the arsenic absolute maximum concentration. Elevated results above the arsenic absolute maximum concentration were measured in samples from: BH7B (fill / mixing layer and interface samples); BH7C (fill / mixing layer samples); BH33C (fill / mixing layer samples); BH34A (interface sample); BH34B (interface sample); and BH34C (interface sample).
Gaudrons / Rob Rae	Yes	Yes	Yes	-
Sugar Mill	Yes	Yes	Yes	-
McCues	Yes	Yes	Yes	-
Hearnes Lake	Yes	Yes	Yes	-
Cut 21	Yes	Yes	No	Mercury exceedance above absolute maximum (1mg/kg) at two samples 42A (1.46 mg/kg) and S75A for (1.13 mg/kg).

Site	Analytical Testing Complies with Column 1 of Table 2 ENM Exemption 2012	Analytical Results Comply with Table 2 of ENM Exemption 2012 ^a		Comments
		Maximum Average Concentration < Column 2	Absolute Maximum Concentration < Column 3	
Cut 29	Yes	Yes except for: Untested at Cut 29 - Bitumen (0.082%) at Fill 29	Yes except for: Untested at Cut 29 - Bitumen (3.92%) at Fill 29_143 Benzo(a)pyrene (1.36 mg/kg) at Fill 29_152. Mountain Way - Lead (109 mg/kg) at MtW3 Ledonies Yard - Arsenic (51.9 mg/kg) at L14A	Exceedance of bitumen noted was revalidated by additional sampling. Additional samples tested were below the absolute maximum concentration & and maximum average concentrations were below criteria. It is noted there was four areas of VENM used as backfill for Cut 29 (totalling 15,000m3).

Footnotes: a) Coffey relied on the data presented in the EAL summary table of laboratory results - see section 4.2.

6. Discussion

Based on the review of the information provided by LFHJV as described above Coffey conclude:

- The laboratory analytical results (as presented in the EAL Summary Tables) reviewed in this study for Cut 28 and Cut 35 unsuitable material comply with the NEPM ASC (1999) HIL-F assessment criteria.
- The analytical parameters (as presented in the EAL Summary Tables) reviewed in this study for the other 8 unsuitable material sites comply with the list of analytical parameters listed in Column 1 of Table 2 of the ENM Exemption 2012.
- The laboratory analytical results (as presented in the EAL Summary Tables) reviewed in this study for the other 8 unsuitable material locations (Banana Shed South, Mountain Way, Gaudrons / Rob Rae, Sugamill, McCues, Hearnes Lake, Cut 21 and Cut 29) comply with the maximum average concentration for characterisation listed in Column 2 of Table 2 of the ENM Exemption 2012.
- The laboratory analytical results (as presented in the EAL Summary Tables) for the other 8 unsuitable material locations comply with the absolute maximum concentration for characterisation listed in Column 3 of Table 2 of the ENM Exemption 2012 with the exception of the following:
 - Arsenic in 5 initial samples (ranging from 43 mg/kg to 117mg/kg) from the base of the placed unsuitable material at Mountain Way.

Subsequent sampling at Mountain Way in the vicinity of locations with elevated results focused on fill / interface layer and indicated samples assessed to be in fill showed no exceedances of the absolute maximum criteria. However, samples assessed to be in a fill / mixing layer (probably related to disturbance of natural ground surface during placement showed elevated arsenic concentrations (ranging from 53 to 150 mg/kg)

exceeding the absolute maximum concentration in three (3) samples and four (4) samples (ranging from 65 to 120 mg/kg) of the assessed interface exceeded the absolute maximum concentration. The data shows the elevated arsenic concentrations were only identified in the mixing and interface layers at the base of the fill and are likely to be sourced from arsenic contamination at the surface of the residual soils, consistent with the behaviour of arsenic residues on former banana lands.

- Lead (109 mg/kg) in one sample (MtW3) from Mountain Way which went into Cut 29.
- Mercury in two samples at S42A (1.46 mg/kg) and S75A (1.13mg/kg) from materials which went into Cut 21.
- Arsenic (51.9 mg/kg) in one sample L14A from Ledonies Yard which went into Cut 29.
- Bitumen (3.92%) in one sample (143) in fill which went into Cut 29. Subsequent additional sampling and analysis in the vicinity of this sample indicated no exceedances of the maximum average and absolute maximum concentrations, suggesting any bitumen present is very localised.
- Benzo(a)pyrene (1.36mg/kg) in one sample (153) in fill which went into Cut 29.

Coffey's review of data exceedances of the absolute maximum concentrations in the ENM Exemption 2012 indicates the total concentrations measured are predominantly significantly below the current amended NEPM ASC (1999 as amended 2013) health criteria for the most sensitive residential land use (HIL-A).

7. Conclusion

Overall Coffey consider:

- The analytical results reviewed for unsuitable materials in Cut 28 and Cut 35 comply with the NEPM ASC (1999) HIL-F criteria.
- The analytical results reviewed for the other eight (8) unsuitable materials sites (Banana Shed South, Mountain Way, Gaudrons / Rob Rae, Sugamill, McCues, Hearnes Lake, Cut 21 and Cut 29) generally complies with the relevant concentrations for ENM Exemption 2012, although there are eleven (11) exceedances of the absolute maximum concentrations noted in this review.

As discussed in this review five (5) of those are related to arsenic in samples from the base of unsuitable material at the Mountain Way site. Based on results of subsequent additional investigations elevated arsenic concentrations were only identified in the mixing and interface layers at the base of the fill and are likely to be sourced from arsenic contamination at the surface of the residual soils, consistent with the behaviour of arsenic residues on former banana lands.

Coffey note that the ENM Exemption was established to enable soils with a low risk of soil contamination to be beneficially reused as a resource at sites other than the source site. As such, soils meeting the ENM chemical criteria are generally regarded as having a low likelihood of contamination.

Coffey's review of data exceedances of the absolute maximum concentrations in the ENM Exemption 2012 indicates the total concentrations measured are predominantly significantly below the current amended NEPM ASC (1999 as amended 2013) health criteria for the most sensitive residential land use (HIL-A). Overall, the analytical results show little evidence of significant contamination and the relatively low concentrations of contaminants indicate the results are likely to be consistent with natural background levels in the area of the S2W project.

8. Limitations

In preparing this report Coffey has relied upon data, surveys, analyses and plans provided by LFHJV and others. Coffey have not independently verified the accuracy or completeness of this information and data.

In accordance with the scope of services, Coffey has relied upon the provided data and has not conducted environmental field monitoring and/or testing in the preparation of the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of soil and/or groundwater conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore merely indicative of the environmental condition as indicated by the data, including the presence or otherwise of contaminants or emissions.

Also, it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time. Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

This report should be read in conjunction with the attached Important Information about your Coffey Environmental Report.

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We trust that this meets your requirements. Please don't hesitate to contact the undersigned if you have any questions.

For and on behalf of Coffey



Tony Scott
Senior Principal

Attachments:

Important Information About Your Coffey Environmental Report

Figure 1 Site Location Plan

Appendix A Excavated Natural Material Exemption 2012

Important information about your Coffey Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site

use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can

reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

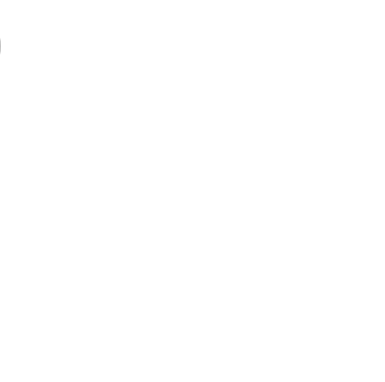
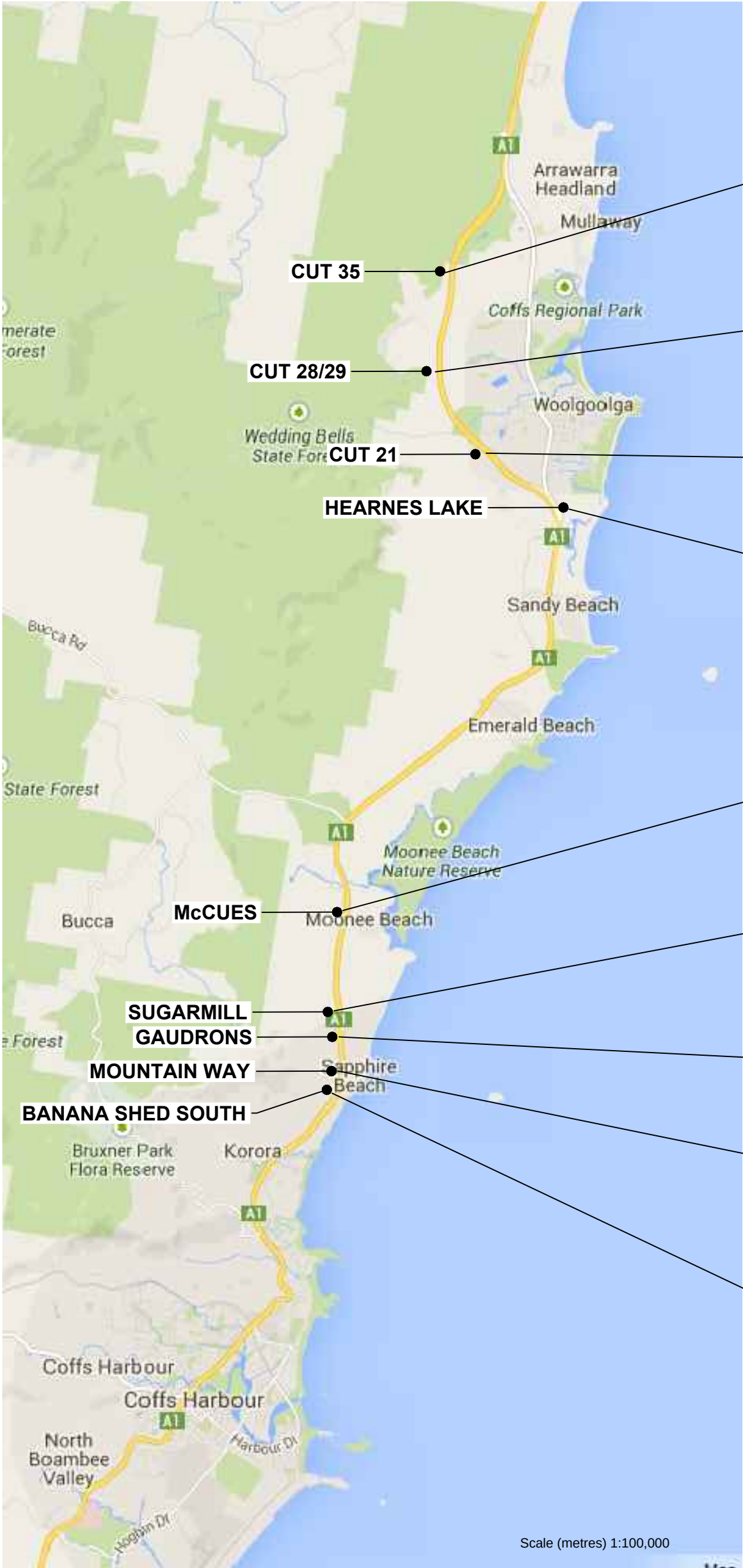
Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

Figure 1

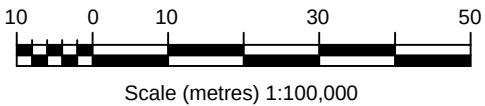
Site Location Plan

PLOT DATE: 9/12/2014 12:53:26 PM DWG FILE: F:\ENVI\PROJECTS\ENAUROD01000-01\099\ENAUROD01060 LFHV S2\DWG\ENAUROD01060AA.DWG



Scale (metres) 1:100,000

revision	no.	description		drawn	approved	date
	A	ORIGINAL ISSUE				



AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.2.2041
AERIAL IMAGE ©: IMAGE @ 2014 DIGITALGLOBE

NOTE:
ALL LOCATION ARE APPROXIMATE
DIMENSIONS IN METRES.

drawn	MV
approved	TS
date	27/11/14
scale	AS SHOWN
original size	A3



client: LEIGHTON FULTON HOGAN JOINT VENTURE (SAPHIRE TO WOOLGOOLGA)		
project: SAPHIRE TO WOOLGOOLGA PACIFIC HIGHWAY, ARRAWARRA TO SAPHIRE BEACH, NSW		
title: UNSUITABLE MATERIAL LOCATIONS		
project no: ENAUROD01060AA	figure no: FIGURE 1	rev: A

Appendix A - ENM Exemption 2012

Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A

The excavated natural material exemption 2012

Name

1. This exemption is to be known as 'The excavated natural material exemption 2012'.

Commencement

2. This exemption commences on 19 October 2012. 'The excavated natural material exemption 2008' which commenced 25 July 2008 is revoked from 19 October 2012.

Duration

3. This exemption is valid until revoked by the Environment Protection Authority (EPA) by notice published in the Government Gazette.

Legislation

4. Under the *Protection of the Environment Operations (Waste) Regulation 2005* (the Regulation):
 - 4.1. Clause 51 (2) authorises the EPA to grant an exemption in relation to any matter or thing including an activity or class of activities, and
 - 4.2. Clause 51A authorises the EPA to exempt a person from any of the following provisions in relation to an activity or class of activities relating to certain waste that is to be land applied or used as a fuel:
 - the provisions of sections 47 to 49 and 88 of the *Protection of the Environment Operations Act 1997* (the Act),
 - the provisions of Schedule 1 to the Act, either in total or as they apply to a particular activity, and
 - the provisions of Part 3 and clauses 45 and 47 of the Regulation.

Exemption

5. In this Notice of Exemption:
 - 5.1. The responsible person listed in Column 1 of Table 1 is exempt from the provision/s listed in Column 2 of that table but only:
 - in relation to activities involving the relevant waste, and
 - where the responsible person complies with the conditions referred to in Column 3 of the table, and
 - in the case of a consumer, in relation to the premises where the waste is applied to land as permitted by clause 7.2.

However, this Notice of Exemption does not exempt the responsible person from the provisions specified in Column 2 where the relevant waste is received at premises that are, despite this exemption, required to be licensed for waste disposal (application to land) activities under the provisions of the Act.

- 5.2. Where a responsible person complies with the conditions of this Notice of Exemption, the activity referred to in Schedule 1 from which that person is exempt is taken to be a non-scheduled activity for the purposes of the Act.

Table 1

Column 1	Column 2	Column 3
Responsible person	Provisions from which the responsible person is exempt	Conditions to be met by the responsible person
Generator	section 48 of the Act in respect of clause 39 of Schedule 1 to the Act	all requirements specified in section 7 and 8
Consumer	section 48 of the Act in respect of clauses 39 and 42 of Schedule 1 to the Act section 88 of the Act clause 47 of the Regulation	all requirements specified in section 7 and 9

This Notice of Exemption is a general exemption for the purposes of clause 51(3) of the Regulation.

Definitions

6. In this Notice of Exemption:

Bgl means below ground level, referring to soil at depth beneath the ground surface.

Characterisation means sampling and testing that must be conducted on the material for the range of chemicals and other attributes listed in Column 1 of Table 2.

Composite sample means a sample that combines 5 sub-samples of equal size into a single sample for the purpose of analysis.

Consumer means a person who applies, causes, or permits the application to land of excavated natural material within the definitions of “application to land” in accordance with the Act. The consumer may be the landholder responsible for the land to which excavated natural material is applied.

Discrete sample means a sample collected and analysed individually that will not be composited.

Excavated natural material is naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

- a) been excavated from the ground, and
- b) contains at least 98% (by weight) natural material, and
- c) does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

Generator means a person who generates excavated natural material for supply to a consumer.

Hotspot means a cylindrical volume which extends through the soil profile from the ground surface to the proposed depth of excavation, where the level of any contaminant listed in Column 1 of Table 2 is greater than the absolute maximum concentration in Column 3 of Table 2.

In situ material means material that exists on or below the ground level. It does not include stockpiled material.

In situ sampling means sampling undertaken on *in situ* material.

Relevant waste means excavated natural material that meets the requirements of Section 7.

Stockpiled material means material that has been excavated from the ground and temporarily stored on the ground prior to use.

Systematic sampling means sampling at points that are selected at even intervals and are statistically unbiased.

Validation means ensuring that test results comply with the conditions of this exemption prior to material being supplied to a consumer.

General conditions

7. This Notice of Exemption is subject to the following conditions:

- 7.1. The chemical concentration or other attribute of the excavated natural material listed in Column 1 of Table 2 must not exceed any of the following:
 - 7.1.1. For characterisation tests, the maximum average (based on the arithmetic mean) concentration or value listed in Column 2 of Table 2, and
 - 7.1.2. The absolute maximum concentration or value listed in Column 3 of Table 2.
- 7.2. The excavated natural material can only be applied to land as engineering fill or used in earthworks.

Generator responsibilities

8. The following conditions must be met by the generator for this exemption to apply:

- 8.1. The generator must prepare a written sampling plan which includes information on sample preparation and storage. The plan must be kept for a period of three years;
- 8.2. The generator must undertake sampling and analysis of the material for Acid Sulfate Soil (ASS) and Potential Acid Sulfate Soil (PASS), in accordance with the *NSW Acid Sulfate Soil Manual*, Acid Sulfate Soils Management Advisory Council, 1998 and the updated *Laboratory Methods Guidelines version 2.1 – June 2004* where:
 - 8.2.1. the pH measured in the material is below 5, and/or
 - 8.2.2. the review of the applicable Acid Sulfate Soil Risk Maps (published by the former Department of Land and Water Conservation and available at <http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm>) indicates the potential presence of Acid Sulfate Soils (ASS).
- 8.3. For stockpiled material, the generator must:
 - 8.3.1. undertake sampling in accordance with Australian Standard 1141.3.1-1996 *Methods for sampling and testing aggregates* – Sampling – Aggregates (or equivalent);
 - 8.3.2. undertake characterisation according to the requirements listed in Columns 1 and 2 of Table 3 for the range of chemicals and other attributes listed in Column 1 of Table 2; and
 - 8.3.3. store the excavated natural material appropriately until the characterisation test results are validated (i.e. obtained and assessed as compliant with this exemption).
- 8.4. For *in situ* material, the generator must:
 - 8.4.1. undertake characterisation for the range of chemicals and other attributes listed in Column 1 of Table 2 according to the requirements listed in Columns 1, 2, and 3 of Table 4. When the ground surface is not comprised of soil (e.g. concrete slab), samples must be taken at the depth at which the soil commences.
 - 8.4.2. undertake sampling at depth according to Column 1 of Table 5.
 - 8.4.3. collect additional soil samples (and analyse them for the range of chemicals and other attributes listed in Column 1 of Table 2), at any

depth exhibiting discolouration, staining, odour or other indicators of contamination inconsistent with soil samples collected at the depth intervals indicated in Table 5.

- 8.4.4. segregate and exclude hotspots identified in accordance with Table 4, from material excavated for reuse under this exemption.
- 8.5. For both stockpiled and *in situ* material the generator must:
 - 8.5.1. keep a written record of all characterisation test results, volume of excavated material, and detected hotspot material for a period of three years; and
 - 8.5.2. provide a written statement of compliance to the consumer with each transaction, certifying that the excavated natural material complies with the relevant conditions of this exemption.

Consumer responsibilities

9. The following conditions must be met by the consumer for this exemption to apply:

- 9.1. The consumer must ensure that the excavated natural material is fit for purpose and poses minimal risk of harm to human health or the environment.
- 9.2. The consumer must keep records of the quantity of the excavated natural material received as well as the suppliers' name and address, for a period of three years.
- 9.3. The consumer must land apply the relevant waste within a reasonable period of time.

Chemical and other material property requirements

10. This Notice of Exemption only applies to excavated natural material where the chemical and other attributes listed in Column 1 of Table 2 comply with the chemical concentrations and other values listed in Column 2 and Column 3 of Table 2, when analysed according to test methods specified in Column 4 of Table 2.

Table 2

Column 1	Column 2	Column 3	Column 4
Chemicals and other attributes	Maximum average concentration for characterisation (mg/kg 'dry weight' unless otherwise specified)	Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)	Test method specified within Section
1. Mercury	0.5	1	12.1
2. Cadmium	0.5	1	12.2
3. Lead	50	100	12.2
4. Arsenic	20	40	12.2
5. Chromium (total)	75	150	12.2
6. Copper	100	200	12.2
7. Nickel	30	60	12.2
8. Zinc	150	300	12.2
9. Electrical Conductivity	1.5 dS/m	3 dS/m	12.3
10. pH *	5 to 9	4.5 to 10	12.3
11. Total Polycyclic Aromatic Hydrocarbons	20	40	12.4

Column 1	Column 2	Column 3	Column 4
Chemicals and other attributes	Maximum average concentration for characterisation (mg/kg 'dry weight' unless otherwise specified)	Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)	Test method specified within Section
(PAHs)			
12. Benzo(a)pyrene	0.5	1	12.4
13. Benzene	NA	0.5	12.5
14. Toluene	NA	65	12.5
15. Ethyl-benzene	NA	25	12.5
16. Xylene	NA	15	12.5
17. Total Petroleum Hydrocarbons C ₁₀ -C ₃₆	250	500	12.6
18. Rubber, plastic, bitumen, paper, cloth, paint and wood	0.05%	0.10%	12.7

* The ranges given for pH are for the minimum and maximum acceptable pH values in the excavated natural material.

Sampling requirements

11. This Notice of Exemption only applies to excavated natural material sampled according to the requirements in Tables 3, 4 and 5.

11.1. Stockpiled excavated natural material must be sampled as per the requirements in Table 3.

11.1.1. Composite sampling must be undertaken for analysis of attributes 1 to 10 and 18 in Column 1 of Table 2. Discrete sampling must be undertaken for analysis of attributes 11 to 17 in Column 1 of Table 2.

11.1.2. Sampling must be undertaken in a manner that ensures all parts of the stockpile are equally accessible for representative sampling.

11.1.3. For stockpiles greater than 4,000 tonnes the number of samples described in Table 3 must be repeated.

Table 3

Sampling of Stockpiled Material		
Column 1	Column 2	Column 3
Quantity (tonnes)	Number of samples	Validation
<500	3	Required
500 – 1,000	4	
1,000 – 2,000	5	
2,000 – 3,000	7	
3,000 – 4,000	10	

11.2. *In situ* material must be sampled by collecting discrete samples as per the requirements of Tables 4 and 5.

11.2.1. Sites larger than 50,000 m² should be subdivided into smaller areas and sampled as per Table 4.

Table 4

<i>In Situ Sampling at surface</i>				
Column 1	Column 2	Column 3	Column 4	Column 5
Size of <i>in situ</i> area (m ²)	Number of systematic sampling points recommended	Distance between two sampling points (m)	Diameter of the hot spot that can be detected with 95% confidence (m)	Validation
500	5	10.0	11.8	Required
1000	6	12.9	15.2	
2000	7	16.9	19.9	
3000	9	18.2	21.5	
4000	11	19.1	22.5	
5000	13	19.6	23.1	
6000	15	20.0	23.6	
7000	17	20.3	23.9	
8000	19	20.5	24.2	
9000	20	21.2	25.0	
10,000	21	21.8	25.7	
15,000	25	25.0	28.9	
20,000	30	25.8	30.5	
25,000	35	26.7	31.5	
30,000	40	27.5	32.4	
35,000	45	27.9	32.9	
40,000	50	28.3	33.4	
45,000	52	29.3	34.6	
50,000	55	30.2	35.6	

Table 4 has been taken from NSW EPA 1995, *Contaminated Sites Sampling Design Guidelines*, NSW Environment Protection Authority.

Table 5

<i>In Situ Sampling at Depth</i>	
Column 1	Column 2
Sampling Requirements *	Validation
1 soil sample at 1.0 m bgl from each surface sampling point followed by 1 soil sample for every metre thereafter. From 1.0 m bgl, sample at the next metre interval until the proposed depth of excavation of the material is reached. If the proposed depth of excavation is between 0.5 to 0.9 m after the last metre interval, sample at the base of the proposed depth of excavation.	Required if the depth of excavation is equal to or greater than 1.0 m bgl

* Refer to Notes for examples

Test method

12. All testing must be undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent. All chemicals and other attributes listed in Column 1 of Table 2 must be measured in accordance with the test methods specified below:

- 12.1. Test methods for measuring the mercury concentration.
 - 12.1.1. Particle size reduction & sample splitting may be required.
 - 12.1.2. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 20% of the stated absolute maximum concentration in Column 3 of Table 2 (i.e. 0.20 mg/kg dry weight).
 - 12.1.3. Report as mg/kg dry weight.
- 12.2. Test methods for measuring chemicals 2 to 8 in Column 1 of Table 2.
 - 12.2.1. Particle size reduction & sample splitting may be required.
 - 12.2.2. Sample preparation by digesting using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils (or an equivalent analytical method).
 - 12.2.3. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit < 10% of the stated absolute maximum concentration in Column 3 of Table 2, (e.g. 10 mg/kg dry weight for lead).
 - 12.2.4. Report as mg/kg dry weight.
- 12.3. Test methods for measuring electrical conductivity and pH.
 - 12.3.1. Sample preparation by mixing 1 part excavated natural material with 5 parts distilled water.
 - 12.3.2. Analysis using Method 103 (pH) and 104 (Electrical Conductivity). *In* Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).
 - 12.3.3. Report electrical conductivity in deciSiemens per metre (dS/m).
- 12.4. Test method for measuring Polynuclear Aromatic Hydrocarbons (PAHs) and benzo(a)pyrene.
 - 12.4.1. Analysis using USEPA SW-846 Method 8100 Polynuclear Aromatic Hydrocarbons (or an equivalent analytical method).
 - 12.4.2. Calculate the sum of all 16 PAHs for total PAHs.
 - 12.4.3. Report total PAHs as mg/kg dry weight.
 - 12.4.4. Report benzo(a)pyrene as mg/kg.
- 12.5. Test method for measuring benzene, toluene, ethylbenzene and xylenes (BTEX).
 - 12.5.1. Method 501 (Volatile Alkanes and Monocyclic Aromatic Hydrocarbons). *In* Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).
 - 12.5.2. Report BTEX as mg/kg.

- 12.6. Test method for measuring Total Petroleum Hydrocarbons (TPH).
 - 12.6.1. Method 506 (Petroleum Hydrocarbons). In Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).
 - 12.6.2. Report as mg/kg dry weight.
- 12.7. Test method for measuring rubber, plastic, bitumen, paper, cloth, paint and wood.
 - 12.7.1. NSW Roads & Traffic Authority Test Method T276 Foreign Materials Content of Recycled Crushed Concrete (or an equivalent method).
 - 12.7.2. Report as percent.

Exemption Granted

**Christopher McElwain
Manager Waste and Resource Strategy
Environment Protection Authority
by delegation**

Notes

The EPA may amend or revoke this exemption at any time. It is the responsibility of the generator and the consumer to ensure that they comply with all relevant requirements of the most current exemption. The current version of an exemption will be available on the EPA website: www.epa.nsw.gov.au.

In gazetting this general exemption, the EPA is exempting the relevant waste from the specific requirements of the Act and Regulations as stated in this exemption. The EPA is not in any way endorsing the use of this substance or guaranteeing that the substance will confer benefit.

The use of exempted material remains subject to other relevant environmental regulations within the Act and Regulations. For example, a person who pollutes land (s142A) or water (s120), or does not meet the special requirements for asbestos waste (clause 42), regardless of having an exemption, is guilty of an offence and subject to prosecution.

For the purposes of arrangements between a generator and a consumer, a 'transaction' is taken to mean the contractual agreement between the two parties which specifies the exchange of waste material from one party to another. A 'statement of compliance' must be in writing and be provided with each transaction.

The conditions set out in this exemption are designed to minimise the risk of potential harm to the environment, human health or agriculture, however, neither this exemption nor these conditions guarantee that the environment, human health or agriculture will not be harmed.

The consumer should assess whether or not the exempted material is fit for the purpose for which the material is proposed to be used and whether this use will cause harm. The consumer may need to seek expert engineering or technical advice.

This exemption does not apply to any material received at premises that are required to be licensed for waste disposal (application to land) activities under the provisions of the Act. This exemption does not remove the need for a site at which processing occurs to be licensed, if required under Schedule 1 of the Act.

This exemption does not alter the requirements of any other relevant legislation that must be met in utilising this material, including for example, the need to prepare a Material Safety Data Sheet (MSDS).

Regardless of any exemption provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with the development consent requirements of the land.

All records required to be kept under this exemption must be made available to authorised officers of the EPA upon request.

Failure to comply with the conditions of this Notice of Exemption may constitute an offence under clause 51 of the Regulation and the responsible person will be required to comply with the normal regulatory provisions.

Examples

In situ sampling at depth

Example 1.

If the proposed depth of ENM excavation is between 1 m bgl and 1.4 m bgl, then:

- 1 sample on surface (as per the requirements of Table 4).
- 1 sample at 1 m bgl.
- No further depth sampling after 1 m bgl, unless required under section 8.4.3.

Example 2.

If the proposed depth of ENM excavation is at 1.75 m bgl, then:

- 1 sample on surface (as per the requirements of Table 4).
- 1 sample at 1 m bgl.
- 1 sample at 1.75 m bgl.
- No further depth sampling after 1.75 m bgl, unless required under section 8.4.3.

Example 3.

If the proposed depth of ENM excavation is at 2.25 m bgl, then:

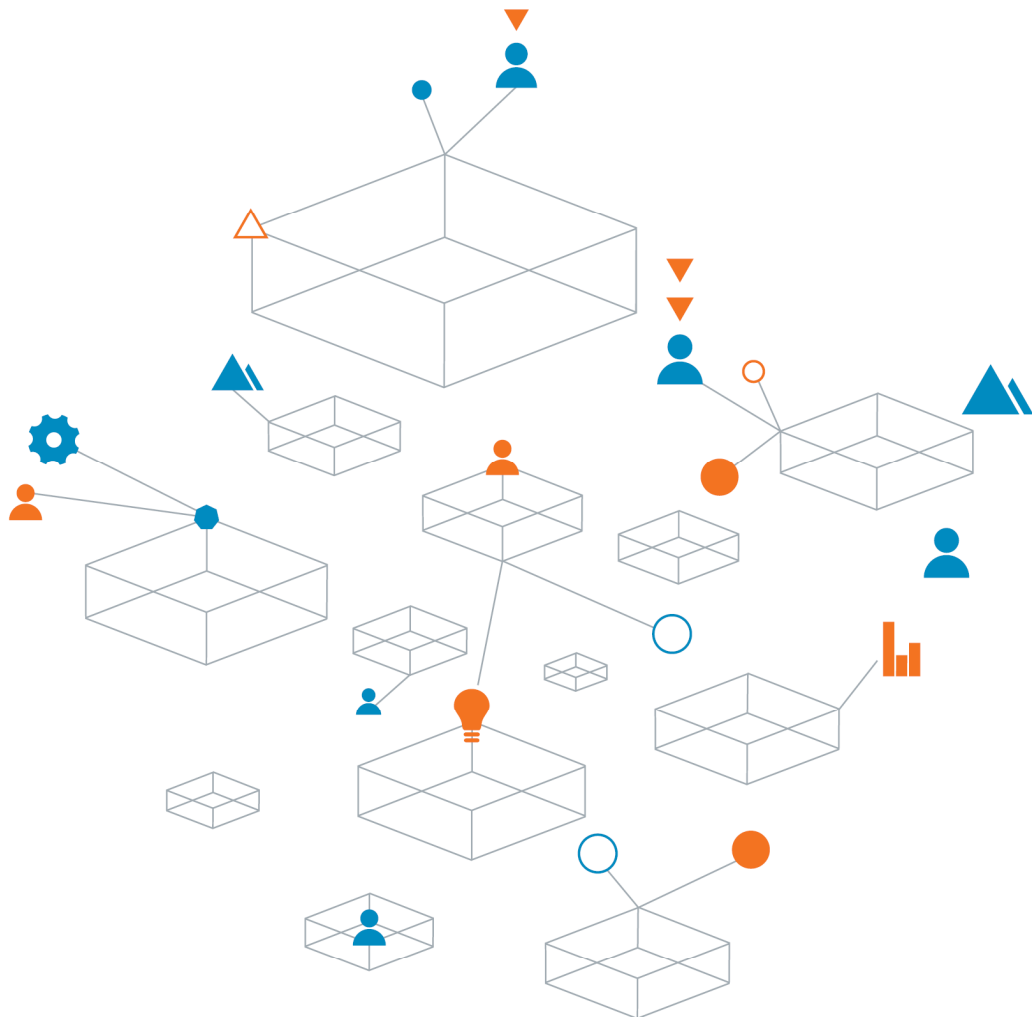
- 1 sample on surface (as per the requirements of Table 4).
- 1 sample at 1 m bgl.
- 1 sample at 2 m bgl.
- No further depth sampling after 2 m bgl, unless required under section 8.4.3.

Leighton Fulton Hogan Joint Venture

**ENM & Site Contamination Assessment of
Arsenic Contamination**

**Mountain Way Stockpile, Sapphire Beach
NSW**

15 December 2014



Trust is the
cornerstone
of all our
projects

15 December 2014

Our ref: GEOTCOFH02820AG-AD

LFHJV
Level 1, 9 Market Street,
WOOLGOOLGA, NSW, 2456

Sent via email: Ian.Chaffey@leicon.com.au

Dear Ian

ENM & Site Contamination Assessment of Arsenic Contamination at Mountain Way Stockpile, Sapphire Beach NSW

1 Introduction

Coffey Geotechnics Pty Ltd (Coffey) was engaged by Leighton Fulton Hogan Joint Venture (LFHJV) to undertake a Site Contamination Assessment (SCA) of arsenic contamination in localised hotspots found within the Mount Way Stockpile on the Pacific Highway - Sapphire to Woolgoolga project, the site.

The stockpile consists of surplus material created during construction of the Pacific Highway – Sapphire to Woolgoolga Upgrade. We understand that the LFHJV placed approximately 63,500m³ of surplus soil materials on this site.

2 Background

Coffey understands that the imported soil material was considered by LFHJV to be excavated natural material (ENM) using an exemption provided by the NSW Environmental Protection Agency (EPA) *The excavated natural material exemption 2012* (ENM Exemption). The ENM exemption allows for the excavated natural material to be applied to land as engineering fill or used in earthworks.

After placement of the material LFHJV undertook a sampling program to validate the imported soil met the requirements of the ENM Exemption. Copies of the LFHJV sampling plan and laboratory summary results tables are provided in Appendix A to this letter report. Laboratory certificates weren't sited in this study.

We understand the LFHJV noted the results of the testing identified samples from TP22, BH5, BH7, BH33 and BH34 had arsenic concentrations exceeding the absolute maximum concentration listed in Table 3 of the ENM Exemption. LFHJV reported the exceedances were in samples from the base of

the test pits and boreholes. We also understand the LFHJV considered that these samples may have included natural soils from beneath the placed material.

LFHJV then engaged Coffey to undertake additional testing at the base of the fill and its interface with the underlying natural soils, around each of the 5 hotspots, to collect additional data on arsenic levels in the base of the fill and the underlying soils.

3 Objectives and Scope of Works

The objective of this SCA was to assess levels of arsenic at the base of surplus fill material and at the interface with natural soil in each of the five hotspots.

The scope of work carried out for the SCA is summarised below:

- A site walkover was undertaken by a Coffey Environmental Scientist on 2 October 2014.
- Nominated test locations were surveyed and marked prior to field investigation by LFHJV. These locations were targeting the arsenic hotspots (Test Locations BH5, BH7, TP22, BH33 & BH34) previously identified within the site.
- Test pits and boreholes with a SPT sampler were used to collect soil samples.
- Samples were collected at varying depths within the soil profile targeting the fill/ mixing layer, interface with the fill and natural soils and the natural profile below the interface.
- A Coffey Environmental Scientist collected soil samples in accordance with relevant guidelines. Samples were placed into laboratory supplied glass jars and stored in a chilled insulated container during fieldwork and transport to the laboratory. Each sample was collected using a clean pair of nitrile gloves.
- Duplicate samples were collected at a rate of one per ten samples and triplicate samples at a rate of one per twenty samples.
- All soil samples collected were analysed by a National Association of Testing Authorities (NATA) certified laboratory.
- The results were compared with the acceptance criteria provided in Table 2 of the ENM Exemption for arsenic of 40 mg/kg (absolute maximum concentration). Any results which exceed the nominated investigation level have been highlighted in Section 6 & 7 of this letter report.

4 Stratigraphy

The subsurface conditions observed during field investigation at the site consisted of four distinct layers, these included:

Fill: consisted of the surplus material that had been previously placed during construction works by LFHJV. The depth of fill varies throughout the site.

Fill/ mixing layer: this was the layer above the interface with the pre-existing soil profile. This layer represents the area disturbed during stripping, spreading and rolling during initial filling works at the site.

Interface: this was the area between the overlain placed fill and pre-existing soil profile below (topsoil/ residual clays or weathered rock) the fill material. The interface layer varied across the site with the following profiles observed at the five arsenic hotspots.

- **Test Location 22** (TP22, 22A, 22B, 22C & 22D), there was no distinct topsoil layer observed during test pitting and the interface was determined as the area between the fill and the underlain residual natural clays.
- **Test Location 5** (BH5, 5A, 5B, 5D), there was no topsoil layer observed during drilling works and the interface was determined as the area between the fill and the underlain highly weathered rock.
- **Test Location 7** (BH7A, 7B, 7C & 7D), there was no distinct topsoil layer observed during drilling works and the interface was determined as the area between the fill and the underlain residual natural clays.
- **Test Location 33 & 34** (BH33, 33A, 33C, 34A, 34B, 34C), a topsoil layer was observed during drilling works for boreholes. This area between the overlying fill and the topsoil was identified as the interface for these locations.

Natural: this was the natural profile below the interface and predominately consisted of residual clays. The exception was the boreholes in the southwest of the site (BH5, BH5A, BH5B and BH5D) associated with test location 5 where highly weathered rock was encountered beneath the fill.

5 Field Investigation

Fieldwork was undertaken on the 2, 9, 10, 13 & 14 October 2014 by a Coffey Environmental Scientist. The sampling methodology followed is summarised in Table 1. The test locations were nominated and marked out prior to field investigation by the LFHJV surveyor.

Table 1: Sampling Methodology

Activity	Detail / Comments
Test pit Investigation	A test pit investigation was undertaken in the southeast portion of the site targeting the arsenic hotspot (test location 22). A test pit was excavated in the vicinity of test location 22 (TP22) and three (3) additional locations (TP22A, 22B & 22C) around the arsenic hotspot. Test pits were excavated to a maximum depth of 2.2m below ground surface (bgs). Soil samples (12 primary) were collected at varying depths within the test pits targeting the interface with the fill and natural soils, and fill and natural soils above and below the interface (~0.3m above and below the interface). There was no visible topsoil layer identified during the excavation of the four (4) test pits.
Borehole Investigation	A borehole investigation was also undertaken within the site targeting the previously identified arsenic hotspots (test location 5, 7, 33 & 34) in the deeper portions of the fill embankment within the site. Test Location 5: Five boreholes (BH5, 5A, 5B, 5C & 5D) were drilled within this area to a maximum depth of 8.3mbgs. Samples (8 primary) were collected from the fill/ mixing layer (0.3-0.5m above interface) and the interface (fill and natural) with the underlain weathered rock. Samples were collected from 4 of the 5 boreholes, with refusal encountered in fill material in BH5B at a depth of 6.4mbgs. No distinct topsoil layer was observed in these boreholes with highly weathered rock encountered directly beneath the fill material. Test Location 7: Five boreholes (BH7, 7A, 7B, 7C & 7D) were drilled within this area to a maximum depth of 8.9mbgs. Samples (12 primary) were collected from the fill/ mixing layer (0.3-0.5m above interface), interface (fill and natural) and the natural underlain residual soils (0.3m below interface). Samples were collected from 4 of the 5 boreholes, with no samples collected from BH7 as drilling works extended beyond the interface prior to sampling. Test Locations 33 & 34: Seven boreholes (BH33, 33A, 33C, BH34, 34A, 34B & 34C) were drilled within this area. These two arsenic hotspots (test locations 33 & 34) were located adjacent to each other on the fill embankment. The boreholes were drilled to a maximum depth of 13mbgs. Samples (17 primary) were collected from the fill/ mixing layer (0.3-0.5m above interface), interface (fill and natural/ topsoil) and the natural underlain residual soils (0.3m below interface). Samples were collected from 6 of the 7 boreholes, with no samples collected from BH34 which extended beyond the interface prior to sampling.

6 Quality Assurance/Quality Control

Samples were transported under chain of custody documentation and in chilled insulated containers to Eurofins mgt Environmental Laboratory which is National Association of Testing Authorities (NATA) certified for the analysis performed. A copy of the laboratory analytical report is attached to this letter report.

For QA/QC purposes 6 duplicate and 3 triplicate soil samples were analysed and the results of the sample testing for these soil samples are summarised in Table LR1.

Reported exceedances of the relative percentage difference (RPD) 50% control limits were found in soil duplicate sample TP22A / QC1 recording an RPD of 65% arsenic; and in triplicate sample BH7C: 7.2m / QC8 recording an RPD of 86% arsenic. The elevated RPDs recorded in these samples are considered by Coffey to be attributable to the heterogeneous nature of arsenic in soils.

The laboratory conducted internal quality control using laboratory duplicates, spikes and method blanks. The results are shown with laboratory analytical report, attached. Analytical methods used for the laboratory testing are also indicated on the laboratory report sheets. The results of laboratory quality control testing are considered to be within acceptable limits.

Based on the above assessment it is considered that the laboratory methods are appropriate and that the data obtained is usable and considered to reasonably represent the concentrations at the sampling points at the time of sampling.

7 Analysis Results and Discussion

The laboratory test results for the primary soil samples collected are summarised in Table LR2 and laboratory certificates of analysis are attached to this letter report. Comparison of soil concentrations to the adopted acceptance criteria provided in Table LR2 is as follows:

Test pitting

- Concentrations of arsenic were below the adopted arsenic acceptance criteria in all samples analysed. Marginally elevated concentrations of arsenic were reported TP22D: 1.1m (32 mg/kg) and 1.8m (37mg/kg), however below the adopted acceptance criteria.

Boreholes

- Concentrations of arsenic were above the adopted acceptance criteria of 40 mg/kg in seven (7) samples from six (6) borehole locations. These exceedances included BH7B: 7.5m (60 mg/kg) and 7.8m (72 mg/kg); BH7C: 7.2m (53 mg/kg); BH33C: 11m (150 mg/kg); BH34A: 12.3m (76 mg/kg); BH34B: 11.35m (120 mg/kg); and BH34C: 10.9m (65 mg/kg).
- The remaining soil sample concentrations ranged from 4.3 mg/kg (BH33: 10.2m) to 38 mg/kg (BH34C), however these samples were below the adopted acceptance criteria.

The laboratory analytical results indicate elevated levels of arsenic greater than the acceptance criteria were reported in seven samples from six boreholes around the three (3) arsenic hotspots (test locations 7, 33 & 34). Photographs for each of six (6) boreholes are attached to this letter report.

In summary the arsenic residues were found to be present in the Fill/ Mixing layer (3 samples) and Interfaces layer (4 samples). The underlying natural clay soils reported arsenic levels at low background levels.

We understand that this stockpile is sited in an area which was previously used for the cultivation of bananas. Coffey has undertaken many assessment of contamination in soils in the former banana lands in the Coffs Harbour area. The arsenic residues in surface soils in former banana plantations

originated from the use of arsenic based sprays. Arsenic residues may remain in soils for many years and even decades after the application of arsenic based pesticides.

Once inorganic arsenic or arsenic oxide based pesticides are applied to soil they revert to arsenates. The arsenate ion is readily absorbed by iron and aluminium components present in soils and it is this reaction which binds and restricts the leaching (downward movement) of arsenic in soil and the availability of arsenic to plants. Consequently these metals may still occur in elevated concentrations in surface soils in former banana lands many decades after the use of these arsenic based sprays has ceased.

8 Conclusions

In sampling undertaken by LFHJV arsenic was present in 5 initial samples at concentrations exceeding the absolute maximum concentration (ranging from 43 mg/kg to 117mg/kg) listed in Table 3 of the ENM Exemption. LFHJV reported the exceedances were in samples from the base of the test pits and boreholes and considered that these samples may have included natural soils from beneath the placed material. Consequently, LFHJV engaged Coffey to undertake additional sampling at the base of the fill / interface layer.

Subsequent sampling by Coffey at Mountain Way in the vicinity of the locations with elevated results focused on fill / interface layer and indicated samples assessed to be in fill showed no exceedances of the absolute maximum criteria. However, samples assessed to be in a fill / mixing layer showed elevated arsenic concentrations (ranging from 53 to 150 mg/kg) exceeding the absolute maximum concentration in three (3) samples and four (4) samples (ranging from 65 to 120 mg/kg) of the assessed interface exceeded the absolute maximum concentration.

Based on results of subsequent additional investigations by Coffey elevated arsenic concentrations were only identified in the mixing and interface layers at the base of the fill and are likely to be sourced from arsenic contamination at the surface of the residual soils, consistent with the behaviour of arsenic residues on former banana lands.

9 References

- DUAP EPA. (1998). *Managing Land Contamination Planning Guidelines, SEPP 55 – Remediation of Land*. Department of Urban Affairs and Planning & Environmental Protection Authority NSW, Sydney
- NEPC (2013). *2013 Amendment of the Assessment of Site Contamination NEPM 1999*. NEPC, Canberra
- NEPC (1999). *National Environmental Protection (Assessment of Site Contamination) Measure*. NEPC, Canberra
- NSW DEC (2006). *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition)*. Department of Environment and Conservation NSW, Sydney
- NSW EPA. (2011). *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*. Environmental Protection Authority NSW, Sydney
- NSW EPA (2012) *Excavated Natural Soils Exemption*. Environmental Protection Authority NSW, Sydney
- NSW EPA. (1995). *Sampling Design Guidelines*. Environmental Protection Authority NSW, Sydney

10 Limitations

In preparing this report Coffey has relied upon data, surveys, analyses and plans provided by LFHJV and others. Coffey have not independently verified the accuracy or completeness of this information and data.

The findings contained in this letter report are the result of discrete/specific methodologies used in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points. If material is observed during construction that does not conform to that described in this letter report, or is suspicious in nature, then an environmental consultant should be contacted and further assessments undertaken.

In preparing this letter report, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith in accordance with Coffey Geotechnics understanding of the client's brief and general accepted practice for environmental consulting.

This letter report was prepared for LFHJV with the objective to assess levels of arsenic present in surplus fill material and at the interface with natural soil in each of the five hotspots.

We draw your attention to the attached sheets entitled "Important Information about Your Coffey Environmental Site Assessment" which should be read in conjunction with this letter report.

I trust that this letter report meets your requirements. If you require further information please contact our Coffs Harbour office on (02) 6651 3213.

For and on behalf of Coffey



Andrew Ballard

Associate Environmental Scientist

Distribution: Original held by: Coffey Geotechnics Pty Ltd
1 electronic copy LFHJV

Attachments: Important Information about Your Coffey Environmental Site Assessment
Table LR1 Results of Quality Control Soil Samples
Table LR2 Laboratory Results for Soil Samples
Photographs
Field Logs
Eurofins mgt Laboratory Certificates of Analysis
Chain of Custody
Appendix A – LFHJV ENM Sampling Plan and Laboratory Summary Results Tables

Important information about your **Coffey** Environmental Site Assessment

Uncertainties as to what lies below the ground on potentially contaminated sites can lead to remediation costs blow outs, reduction in the value of the land and to delays in the redevelopment of land. These uncertainties are an inherent part of dealing with land contamination. The following notes have been prepared by Coffey to help you interpret and understand the limitations of your environmental site assessment report.

Your report has been written for a specific purpose

Your report has been developed on the basis of a specific purpose as understood by Coffey and applies only to the site or area investigated. For example, the purpose of your report may be:

- To assess the environmental effects of an on-going operation.
- To provide due diligence on behalf of a property vendor.
- To provide due diligence on behalf of a property purchaser.
- To provide information related to redevelopment of the site due to a proposed change in use, for example, industrial use to a residential use.
- To assess the existing baseline environmental, and sometimes geological and hydrological conditions or constraints of a site prior to an activity which may alter the sites environmental, geological or hydrological condition.

For each purpose, a specific approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible, quantify risks that both recognised and unrecognised contamination pose to the proposed activity. Such risks may be both financial (for example, clean up costs or limitations to the site use) and physical (for example, potential health risks to users of the site or the general public).

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man and may change with time. For example, groundwater levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project and/or on the property.

Interpretation of factual data

Environmental site assessments identify actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from indirect field measurements and sometimes other reports on the site are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of Coffey through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered with redevelopment or on-going use of the site. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Important information about your **Coffey** Environmental Site Assessment

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. In particular, a due diligence report for a property vendor may not be suitable for satisfying the needs of a purchaser. Your report should not be applied for any purpose other than that originally specified at the time the report was issued.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other professionals who are affected by the report. Have Coffey explain the report implications to professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel), field testing and laboratory evaluation of field samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Contact Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to land development and land use. It is common that not all approaches will be necessarily dealt with in your environmental site assessment report due to concepts proposed at that time. As a project progresses through planning and design toward construction and/or maintenance, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Environmental reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

Table LR1: Results of Quality Control Soil Samples

	Primary Sample	Duplicate Sample	RPD (%)	Primary Sample	Duplicate Sample	RPD (%)
Sample ID	TP22A	QC1		TP22C	QC3	
Material	Soil	Soil	%RPD between TP22A: 0.5 and QC1	Soil	Soil	%RPD between TP22C: 0.4 and QC3
Date of Sampling						
Depth (m)	0.50			0.40		
Metals						
Arsenic	2.8	5.5	65	2.8	3	7

	Primary Sample	Duplicate Sample	RPD (%)	Primary Sample	Duplicate Sample	RPD (%)	Primary Sample	Triplicate Sample	RPD (%)
Sample ID	TP22D	QC5		BH7C	QC7		BH7C	QC8	
Material	Soil	Soil	%RPD between TP22D and QC5	Soil	Soil	%RPD between BH7C: 7.2 and QC7	Soil	Soil	%RPD between BH7C: 7.2 and QC8
Date of Sampling									
Depth (m)	1.80	1.80		7.20			7.20		
Metals									
Arsenic	37	37	0	53	46	14	53	21	86

	Primary Sample	Duplicate Sample	RPD (%)	Primary Sample	Triplicate Sample	RPD (%)	Primary Sample	Duplicate Sample	RPD (%)	Primary Sample	Triplicate Sample	RPD (%)
Sample ID	BH7D	QC9		BH7D	QC10		BH33	QC13		Bh33	QC14	
Material	Soil	Soil	%RPD between BH7D: 6.9 and QC9	Soil	Soil	%RPD between BH7D: 6.9 and QC10	Soil	Soil	%RPD between B3: 0.15-0.3 and QC4	Soil	Soil	%RPD between C3: 0.15-0.3 and QC5
Date of Sampling												
Depth (m)	6.90	6.90		6.90	6.90							
Metals												
Arsenic	11	10	10	11	13	17	4.3	4	7	4.3	< 2	Inconsistent

Notes:

Value	RPD exceeds control limit of 50%
	NA Both samples have concentrations below laboratory's Limit of Reporting (LOR)

Table LR2: Laboratory Results for Soil Samples

Test pit No.	Acceptance Criteria	TP22A			TP22B			TP22C			TP22D		
Depth (m)		0.5	0.75	1	0.65	1.1	1.3	0.4	0.9	1.1	1.1	1.8	2
Material		Fill	Interface	Natural	Fill	Interface	Natural	Fill	Interface	Natural	Fill	Interface	Natural
Date of Sampling		2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14	2-Oct-14
Metals													
Arsenic	40 ¹	2.8	20	11	8.2	16	15	4.2	31	2.7	32	37	4

Borehole No.	Acceptance Criteria	BH5		BH5A		BH5B		BH5D	
Depth (m)		7.2	7.5	5.4	5.7	7.9	8.3	7	7.3
Material		Fill	Interface	Fill	Interface	Fill	Interface	Fill	Interface
Date of Sampling		9-Oct-14	9-Oct-14	9-Oct-14	9-Oct-14	9-Oct-14	9-Oct-14	9-Oct-14	9-Oct-14
Metals									
Arsenic	40 ¹	15	7.8	12	7.2	4.1	18	6	8.3

Borehole No.	Acceptance Criteria	BH7A			BH7B			BH7C			BH7D		
Depth (m)		6.4	6.7	7	7.5	7.8	8.1	7.2	7.5	7.8	6.9	7.25	7.6
Material		Fill / Mixing Layer	Interface	Natural	Fill / Mixing Layer	Interface	Natural	Fill / Mixing Layer	Interface	Natural	Fill / Mixing Layer	Interface	Natural
Date of Sampling		10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14	10-Oct-14
Metals													
Arsenic	40 ¹	18	30	15	60	72	13	53	24	10	11	25	12

Borehole No.	Acceptance Criteria	BH33		BH33A		BH33C			
Depth (m)		10.2	10.6	10.3	10.6	10.9	11	11.4	11.7
Material		Fill / Mixing Layer	Interface	Fill / Mixing Layer	Interface	Natural	Fill / Mixing Layer	Interface	Natural
Date of Sampling		14-Oct-14	14-Oct-14	14-Oct-14	14-Oct-14	14-Oct-14	13-Oct-14	13-Oct-14	13-Oct-14
Metals									
Arsenic	40 ¹	4.3	11	38	13	10	150	16	8.8

Borehole No.	Acceptance Criteria	BH34A			BH34B			BH34C		
Depth (m)		11.9	12.3	12.6	10.9	11.35	11.8	10.6	10.9	11.2
Material		Fill / Mixing Layer	Interface	Natural	Fill / Mixing Layer	Interface	Natural	Fill / Mixing Layer	Interface	Natural
Date of Sampling		13-Oct-14	13-Oct-14	13-Oct-14	14-Oct-14	14-Oct-14	14-Oct-14	13-Oct-14	13-Oct-14	13-Oct-14
Metals										
Arsenic	40 ¹	12	76	6	13	120	7.4	38	65	6.2

Notes:

Value	Concentration exceeds the Acceptance Criteria
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¹ NSW EPA Excavated Natural Materials Exemption (2012) - Table 2, Column 3 Absolute Maximum Concentration.
All results are reported in mg/kg

Photographs

The arrows in the below photographs indicates highest to deepest point of borehole. Note: Sample recovery from SPT varies and depths shown are approximate.



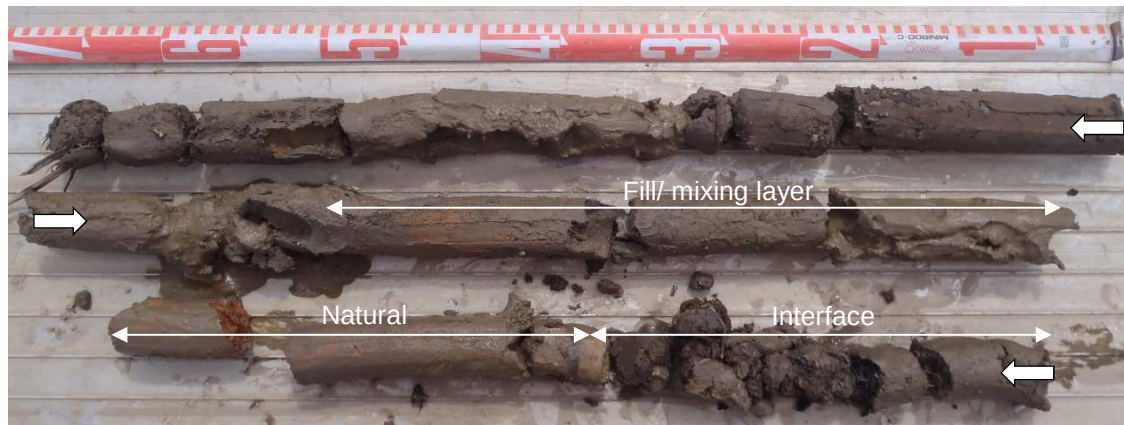
Photograph 1, shows undisturbed sample recovered from BH7B: 7.5m to 8.4m.



Photograph 2, shows undisturbed sample recovered from BH7C: 7.0m to 7.9m.



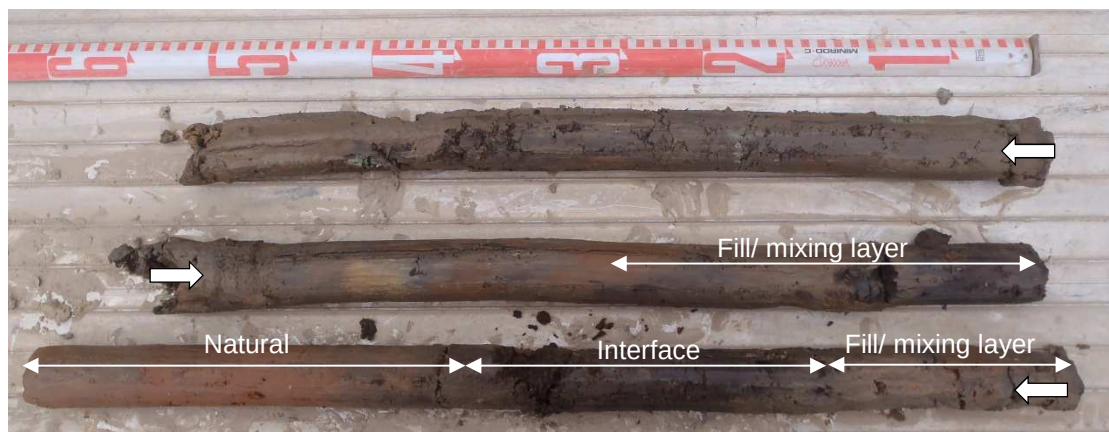
Photograph 3, shows undisturbed sample recovered from BH33C: 9.0m to 11.7m.



Photograph 4, shows undisturbed sample recovered from BH34A: 11.6m to 12.7m.



Photograph 5, shows undisturbed sample recovered from BH34B: 10m to 11.8m.



Photograph 6, shows undisturbed sample recovered from BH34C: 10m to 11.25m.

Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH5**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started:

date completed:

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD/T	1	2	3							FILL: mixed layers of fill through profile varying in thickness.			100	FILL
						1.0					200			
						2.0					300			
						3.0					400			
						4.0								
						5.0								
						6.0								
						7.0								
						8.0								
						9.0								
									ARGILLITE: pale brown-white, fine to medium, some silty clay. Borehole BH5 terminated at 7.5 m Refusal				HIGHLY WEATHERED ARGILLITE	

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

Borehole ID.	BH5A
sheet:	1 of 1
project no.	GEOTCOFH02820AG
date started:	09 Oct 2014
date completed:	09 Oct 2014
logged by:	JP
checked by:	AB

client: ***Leighton Fulton Hogan Joint Venture***
principal:
project: ***SCA Arsenic Contamination Mountain Way Stockpile***
location: ***Mountain Way Stockpile***

position:	Not Specified	surface elevation :	Not Specified	angle from horizontal:	90°
drill model:		mounting:		hole diameter :	

drilling information						material substance							
method & support	penetration		water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
						0.0			FILL: mixed layers of fill through profile varying in thickness.				FILL
						1.0							
						2.0							
						3.0							
						4.0							
						5.0							
				D									
				D									
						6.0			ARGILLITE: fine grained, some bands of clay.				HIGHLY WEATHERED ARGILLITE
						7.0			Borehole BH5A terminated at 5.9 m Refusal				

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH5B**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **09 Oct 2014**

date completed: **09 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance								
method & support	penetration			samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2	3										
AD/T						FILL: mixed layers of fill through profile varying in thickness.						FILL	
													1.0
													2.0
													3.0
													4.0
													5.0
													6.0
													7.0
													8.0
													9.0
					ARGILLITE: pale brown-white, fine to medium, some silty clay. Borehole BH5B terminated at 8.30 m Refusal					HIGHLY WEATHERED ARGILLITE			

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH5C**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **09 Oct 2014**

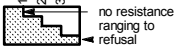
date completed: **09 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD/T	1							FILL: mixed fill silty CLAY, some gravel fine to coarse and cobble, soil.			100	FILL
	2				1.0		200					
	3				2.0		300					
					3.0		400					
					4.0							
					5.0							
					6.0							
					7.0							
								Borehole BH5C terminated at 6.4 m Refusal				Refusal on potential large boulder. Mulch and organics at 6.3m, geofabric (SPT Refusal)

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH5D**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **09 Oct 2014**

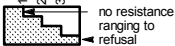
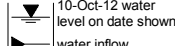
date completed: **09 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance								
method & support	penetration		water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2											
ADIT						1.0			FILL: mixed layers of fill through profile varying in thickness.			<	

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water  water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH7**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **10 Oct 2014**

date completed: **10 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance									
method & support	1 penetration	2 penetration	3 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/T							1.0			FILL: mixed layers of fill through profile varying in thickness.				FILL
							2.0							
							3.0							
							4.0							
							5.0							
							6.0							
							7.0							
							8.0							
							9.0							

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH7A**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **10 Oct 2014**

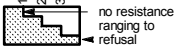
date completed: **10 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance										
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)		structure and additional observations
	1	2	3										100	200	
AD/T									FILL: mixed layers of fill through profile varying in thickness.						FILL
									large tree root SPT refusal					RESIDUAL	
								CL	CLAY: medium plasticity, pale brown/dark grey, mottled dark orange. colour change dark orange-pale brown some rock structure						
									Borehole BH7A terminated at 7.10 m Target depth						

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH7B**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **10 Oct 2014**

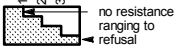
date completed: **10 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information							material substance								
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations	
ADIT	1	2	3							FILL: mixed layers of fill through profile varying in thickness.			100	FILL	
							1.0						200		
							2.0						300		
							3.0						400		
							4.0								
							5.0								
							6.0								
							7.0			Water inflow					
					D										
					D										
				D		8.0		CL	Traces of roots, potential old topsoil				RESIDUAL		
									CLAY: medium plasticity, pale brown-dark orange, mottled white-dark yellow, grading to white-dark yellow with increase in depth.						
									Borehole BH7B terminated at 8.4 m Target depth						
							9.0								

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  no resistance ranging to refusal 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH7C**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **10 Oct 2014**

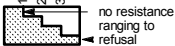
date completed: **10 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD/T	1	2	3							FILL: mixed layers of fill through profile varying in thickness.			100	FILL
						1.0					200			
						2.0					300			
						3.0					400			
						4.0								
						5.0								
						6.0								
						7.0								

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

Borehole ID.	BH7D
sheet:	1 of 1
project no.	GEOTCOFH02820AG
date started:	10 Oct 2014
date completed:	10 Oct 2014
logged by:	JP
checked by:	AB

client: ***Leighton Fulton Hogan Joint Venture***
principal:
project: ***SCA Arsenic Contamination Mountain Way Stockpile***
location: ***Mountain Way Stockpile***

position:	Not Specified	surface elevation :	Not Specified	angle from horizontal:	90°
drill model:		mounting:		hole diameter :	

drilling information						material substance						
method & support	1 penetration	2 water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/T					1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0			FILL: mixed layers of fill through profile varying in thickness.				FILL
								some roots, potential old topsoil CLAY: medium plasticity, dark orange-dark red/pale orange-pale brown, some quartz gravel fine to medium.				RESIDUAL
								Borehole BH7D terminated at 7.9 m Target depth				

method		support		samples & field tests		classification symbol & soil description		consistency / relative density	
AD	auger drilling*	M	mud	B	bulk disturbed sample	based on Unified Classification System		VS	very soft
AS	auger screwing*	C	casing	D	disturbed sample	moisture D dry M moist W wet Wp plastic limit Wl liquid limit	S	soft	
RR	roller/tricone			E	environmental sample		F	firm	
W	washbore			SS	split spoon sample		St	stiff	
CT	cable tool			U##	undisturbed sample ##mm diameter		VSt	very stiff	
HA	hand auger			HP	hand penetrometer (kPa)		H	hard	
DT	diatube			N	standard penetration test (SPT)		Fb	friable	
B	blank bit			N*	SPT - sample recovered		VL	very loose	
V	V bit			Nc	SPT with solid cone		L	loose	
T	TC bit			VS	vane shear; peak/remoulded (kPa)		MD	medium dense	
*	bit shown by suffix			R	refusal		D	dense	
e.g.	AD/T			HB	hammer bouncing		VD	very dense	

penetration	
	
water	
	10-Oct-12 water level on date shown
	water inflow
	water outflow

Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH33**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **14 Oct 2014**

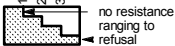
date completed: **14 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance							
method & support	1 penetration	2 water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD/T	1							FILL: mixed layers of fill through profile varying in thickness.			100	FILL
	2				2.0						200	
	3									300		
					4.0					400		
					6.0							
					8.0							
					10.0							
							CL	TOPSOIL: SILTY CLAY: medium to high plasticity, dark grey-black, some fine roots and traces of charcoal. CLAY: medium plasticity, dark orange, some gravel fine to medium, subrounded. Borehole BH33 terminated at 10.80 m Target depth				TOPSOIL RESIDUAL Unable to sample 0.3m below interface as rock cave in above stopping sample recovery
					12.0							

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH33A**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **14 Oct 2014**

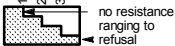
date completed: **14 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation: Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter:

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD/T	1							FILL: mixed layers of fill through profile varying in thickness.			100	FILL
	2										200	
	3										300	
											400	
				D		10.0		CL	TOPSOIL: SILTY CLAY: medium to high plasticity, dark grey-black, some fine roots.			TOPSOIL
			D					CLAY: medium plasticity, dark orange-brown, mottled white/dark yellow.			RESIDUAL	
			D					Borehole BH33A terminated at 10.9 m Target depth				

method	support	samples & field tests	classification symbol & soil description	consistency / relative density
AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	M mud C casing N nil penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	based on Unified Classification System moisture D dry M moist W wet Wp plastic limit WL liquid limit	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Engineering Log - Borehole

Borehole ID. **BH33C**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

client: **Leighton Fulton Hogan Joint Venture**

date started:

principal:

date completed:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

logged by: **JP**

location: **Mountain Way Stockpile**

checked by: **AB**

position:	Not Specified
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surface elevation : Not Specified

angle from horizontal: 90°

drill model:

mounting:

hole diameter :

drilling information					material substance									
method & support	1 penetration	2 penetration	3 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/T	1	2	3				2.0			FILL: mixed layers of fill through profile varying in thickness.				FILL
							4.0							
							6.0							
							8.0							
							10.0							
							12.0							
							14.0							

Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH34**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **13 Oct 2014**

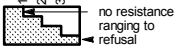
date completed: **14 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance									
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations		
ADT	1							FILL: mixed layers of fill through profile varying in thickness.			100	FILL		
	2				2.0						200			
	3				4.0						300			
					6.0						400			
					8.0									
					10.0									
					12.0									
							CL		CLAY: medium plasticity, dark orange, mottled white/pale brown. Borehole BH34 terminated at 13.0 m Target depth					RESIDUAL Missed the interface - no samples collected
					14.0									

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH34A**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **13 Oct 2014**

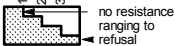
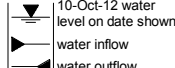
date completed: **13 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD	1	2	3							FILL: mixed layers of fill through profile varying in thickness. <				

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown 	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH34B**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **14 Oct 2014**

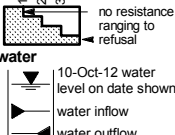
date completed: **14 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance								
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations	
AD/T	1							FILL: mixed layers of fill through profile varying in thickness.			100	FILL	
	2												200
	3												300
													400
								CL	TOPSOIL: SILTY CLAY: medium to high plasticity, dark grey/black, some fine roots and charcoal. CLAY: medium plasticity, dark orange, mottled pale brown. Borehole BH34B terminated at 11.80 m Target depth			TOPSOIL RESIDUAL	

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil	penetration  no resistance ranging to refusal 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **BH34C**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started:

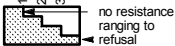
date completed:

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: mounting: hole diameter :

drilling information					material substance								
method & support	penetration		water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2											
ADIT									FILL: mixed layers of fill through profile varying in thickness.				FILL
					2.0								
					4.0								
					6.0								
					8.0								
					10.0								

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Test pit

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **TP22A**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **02 Oct 2014**

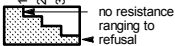
date completed: **02 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: JCB-3CX mounting: Backhoe hole diameter :

drilling information				material substance						
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density
								SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components		hand penetrometer (kPa)
										100 200 300 400
								FILL: GRAVELLY CLAY: low to medium plasticity, white/brown/dark orange, gravel, fine to coarse, subangular, some fine roots.		
								FILL: SILTY CLAY: medium plasticity, dark grey/grey.		
								FILL: SILTY CLAY: medium plasticity, dark grey, some roots, timber <20mm diameter.		
								CLAY: medium plasticity, dark orange-brown, some gravel, fine to medium, subangular.	>Wp	
								Test pit TP22A terminated at 1.2 m Target depth		

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Test pit

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **TP22B**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **02 Oct 2014**

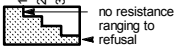
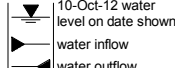
date completed: **02 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: JCB-3CX mounting: Backhoe hole diameter :

drilling information				material substance						
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density
	1 2 3							SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components		hand penetrometer (kPa) 100 200 300 400
BH N	Not Observed	Not Observed	D		0.5			FILL: GRAVELLY CLAY: low to medium plasticity, brown - pale brown/grey - dark grey, gravel, fine to coarse, subangular, traces of timber <50mm diameter.		
								FILL: TIMBER MULCH: brown - dark brown, timber up to 20cm diameter, some clay, fine to medium.		
			D		1.0	CL		CLAY: medium plasticity, dark orange - dark yellow/pale yellow, some gravel, fine to coarse, subangular.	>Wp	
			D							
					1.5			Test pit TP22B terminated at 1.4 m Target depth		
					2.0					
					2.5					

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown 	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Test pit

Borehole ID.	TP22C
sheet:	1 of 1
project no.	GEOTCOFH02820AG
date started:	02 Oct 2014
date completed:	02 Oct 2014
logged by:	JP
checked by:	AB

client: ***Leighton Fulton Hogan Joint Venture***
principal:
project: ***SCA Arsenic Contamination Mountain Way Stockpile***
location: ***Mountain Way Stockpile***

from horizontal: 90°

position: Not Specified surface elevation : Not Specified
drill model: JCB-3CX mounting: Backhoe hole diameter :

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
BH N Not Observed	1 2 3		D		0.5			FILL: SILTY CLAY: low to medium plasticity, grey-dark grey, some gravel, fine to coarse, subangular and timber <10cm diameter.			100 200 300 400	FILL
			D									
			D		1.0	CL	CLAY: medium plasticity, dark orange-dark yellow, mottled white, some gravel fine to medium, subangular (quartz).	>Wp			potential compressed old topsoil layer, however no fine roots or organics observed	
			D				Test pit TP22C terminated at 1.1 m Target depth				RESIDUAL	
					1.5							
					2.0							
					2.5							

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing penetration water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Test pit

client: **Leighton Fulton Hogan Joint Venture**

principal:

project: **SCA Arsenic Contamination Mountain Way Stockpile**

location: **Mountain Way Stockpile**

Borehole ID. **TP22D**

sheet: 1 of 1

project no. **GEOTCOFH02820AG**

date started: **02 Oct 2014**

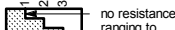
date completed: **02 Oct 2014**

logged by: **JP**

checked by: **AB**

position: Not Specified surface elevation : Not Specified angle from horizontal: 90°
drill model: JCB-3CX mounting: Backhoe hole diameter :

drilling information				material substance						
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density
	1 2 3							FILL: SILTY CLAY: medium plasticity, dark grey-dark brown, some gravel, fine to coarse, subangular. A piece of wire and a brick were observed.		
		Not Observed			0.5					
			D		1.0					
					1.5			FILL: TIMBER MULCH: brown - dark brown, timber up to 20cm diameter, some clay, fine to medium.		
			D		2.0		CL	CLAY: medium plasticity, dark orange-dark yellow mottled white, some gravel, quartz, fine to coarse, subangular and rock structure.	>Wp	
			D							
					2.5			Test pit TP22D terminated at 2.2 m Target depth		

method	support	penetration	samples & field tests	classification symbol & soil description	consistency / relative density
AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	M mud C casing N nil water 10-Oct-12 water level on date shown water inflow water outflow	 no resistance ranging to refusal	B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Rock Description Explanation Sheet (1 of 2)

The descriptive terms used by Coffey are given below. They are broadly consistent with Australian Standard AS1726-1993.

DEFINITIONS: Rock substance, defect and mass are defined as follows:

Rock Substance In engineering terms rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Other material is described using soil descriptive terms. Effectively homogenous material, may be isotropic or anisotropic.

Defect Discontinuity or break in the continuity of a substance or substances.

Mass Any body of material which is not effectively homogeneous. It can consist of two or more substances without defects, or one or more substances with one or more defects.

SUBSTANCE DESCRIPTIVE TERMS:

ROCK NAME Simple rock names are used rather than precise geological classification.

PARTICLE SIZE Grain size terms for sandstone are:
Coarse grained Mainly 0.6mm to 2mm
Medium grained Mainly 0.2mm to 0.6mm
Fine grained Mainly 0.06mm (just visible) to 0.2mm

FABRIC Terms for layering of penetrative fabric (eg. bedding, cleavage etc.) are:

Massive No layering or penetrative fabric.

Indistinct Layering or fabric just visible. Little effect on properties.

Distinct Layering or fabric is easily visible. Rock breaks more easily parallel to layering of fabric.

CLASSIFICATION OF WEATHERING PRODUCTS

Term	Abbreviation	Definition
Residual Soil	RS	Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely Weathered Material	XW	Material is weathered to such an extent that it has soil properties, ie, it either disintegrates or can be remoulded in water. Original rock fabric still visible.
Highly Weathered Rock	HW	Rock strength is changed by weathering. The whole of the rock substance is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Some minerals are decomposed to clay minerals. Porosity may be increased by leaching or may be decreased due to the deposition of minerals in pores.
Moderately Weathered Rock	MW	The whole of the rock substance is discoloured, usually by iron staining or bleaching, to the extent that the colour of the fresh rock is no longer recognisable.
Slightly Weathered Rock	SW	Rock substance affected by weathering to the extent that partial staining or partial discolouration of the rock substance (usually by limonite) has taken place. The colour and texture of the fresh rock is recognisable; strength properties are essentially those of the fresh rock substance.
Fresh Rock	FR	Rock substance unaffected by weathering.

Notes on Weathering:

- AS1726 suggests the term "Distinctly Weathered" (DW) to cover the range of substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction, DW may be used with the definition given in AS1726.
- Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "altered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.

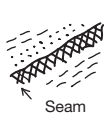
ROCK SUBSTANCE STRENGTH TERMS

Term	Abbreviation	Point Load Index, $I_{p(50)}$ (MPa)	Field Guide
Very Low	VL	Less than 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with a knife; pieces up to 30mm thick can be broken by finger pressure.
Low	L	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show with firm bows of a pick point; has a dull sound under hammer. Pieces of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	0.3 to 1.0	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	H	1 to 3	A piece of core 150mm long by 50mm can not be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	VH	3 to 10	Hand specimen breaks after more than one blow of a pick; rock rings under hammer.
Extremely High	EH	More than 10	Specimen requires many blows with geological pick to break; rock rings under hammer.

Notes on Rock Substance Strength:

- In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.
- The term "extremely low" is not used as a rock substance strength term. While the term is used in AS1726-1993, the field guide therein makes it clear that materials in that strength range are soils in engineering terms.
- The unconfined compressive strength for isotropic rocks (and anisotropic rocks which fall across the planar anisotropy) is typically 10 to 25 times the point load index $I_{p(50)}$. The ratio may vary for different rock types. Lower strength rocks often have lower ratios than higher strength rocks.

Rock Description Explanation Sheet (2 of 2)

COMMON DEFECTS IN ROCK MASSES		Diagram	Map Symbol	Graphic Log (Note 1)	DEFECT SHAPE	TERMS
Term	Definition				Planar	The defect does not vary in orientation
Parting	A surface or crack across which the rock has little or no tensile strength. Parallel or sub parallel to layering (eg bedding) or a planar anisotropy in the rock substance (eg, cleavage). May be open or closed.		20 Bedding 20 Cleavage	 (Note 2)	Curved	The defect has a gradual change in orientation
Joint	A surface or crack across which the rock has little or no tensile strength, but which is not parallel or sub parallel to layering or planar anisotropy in the rock substance. May be open or closed.		60	 (Note 2)	Undulating	The defect has a wavy surface
Sheared Zone (Note 3)	Zone of rock substance with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks.		35		Stepped	The defect has one or more well defined steps
Sheared Surface (Note 3)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.		40		Irregular	The defect has many sharp changes of orientation
Crushed Seam (Note 3)	Seam with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock substance which may be more weathered than the host rock. The seam has soil properties.		50		ROUGHNESS TERMS	
Infilled Seam	Seam of soil substance usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1mm thick may be described as veneer or coating on joint surface.		65		Slickensided	Grooved or striated surface, usually polished
Extremely Weathered Seam	Seam of soil substance, often with gradational boundaries. Formad by weathering of the rock substance in place.		32		Polished	Shiny smooth surface
					Smooth	Smooth to touch. Few or no surface irregularities
					Rough	Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper.
					Very Rough	Many large surface irregularities (amplitude generally more than 1mm). Feels like, or coarser than very coarse sand paper.
					COATING TERMS	
					Clean	No visible coating
					Stained	No visible coating but surfaces are discoloured
					Veneer	A visible coating of soil or mineral, too thin to measure; may be patchy
					Coating	A visible coating up to 1mm thick. Thicker soil material is usually described using appropriate defect terms (eg, infilled seam). Thicker rock strength material is usually described as a vein.
					BLOCK SHAPE TERMS	
					Blocky	Approximately equidimensional
					Tabular	Thickness much less than length or width
					Columnar	Height much greater than cross section

Notes on Defects:

1. Usually borehole logs show the true dip of defects and face sketches and sections the apparent dip.
2. Partings and joints are not usually shown on the graphic log unless considered significant.
3. Sheared zones, sheared surfaces and crushed seams are faults in geological terms.

Soil Description Explanation Sheet (1 of 2)

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 µm to 2.36 mm
	medium	200 µm to 600 µm
	fine	75 µm to 200 µm

MOISTURE CONDITION

Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE

ZONING	CEMENTING
Layers Continuous across exposure or sample.	Weakly cemented Easily broken up by hand in air or water.
Lenses Discontinuous layers of lenticular shape.	Moderately cemented Effort is required to break up the soil by hand in air or water.
Pockets Irregular inclusions of different material.	

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material Structure and fabric of parent rock visible.

Residual soil Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil Deposited by wind.

Alluvial soil Deposited by streams and rivers.

Colluvial soil Deposited on slopes (transported downslope by gravity).

Fill Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.

Lacustrine soil Deposited by lakes.

Marine soil Deposited in ocean basins, bays, beaches and estuaries.

Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)					USC	PRIMARY NAME			
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVELS (Little or no fines)		Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	GRAVEL		
					Predominantly one size or a range of sizes with more intermediate sizes missing.	GP	GRAVEL		
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)		GM	SILTY GRAVEL		
				Plastic fines (for identification procedures see CL below)		GC	CLAYEY GRAVEL		
		SANDS More than half of coarse fraction is smaller than 2.36 mm	CLEAN SANDS (Little or no fines)		Wide range in grain sizes and substantial amounts of all intermediate sizes	SW	SAND		
					Predominantly one size or a range of sizes with some intermediate sizes missing.	SP	SAND		
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	SILTY SAND		
				Plastic fines (for identification procedures see CL below).		SC	CLAYEY SAND		
		FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.					
				SILTS & CLAYS Liquid limit less than 50	DRY STRENGTH	DILATANCY	TOUGHNESS		
None to Low	Quick to slow				None	ML	SILT		
Medium to High	None				Medium	CL	CLAY		
Low to medium	Slow to very slow				Low	OL	ORGANIC SILT		
SILTS & CLAYS Liquid limit greater than 50	Low to medium				Slow to very slow	Low to medium	MH	SILT	
	High				None	High	CH	CLAY	
	Medium to High	None	Low to medium	OH	ORGANIC CLAY				
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture.				Pt	PEAT			
• Low plasticity – Liquid Limit w_L less than 35%. • Medium plasticity – w_L between 35% and 50%. • High plasticity – w_L greater than 50%.									

• Low plasticity – Liquid Limit w_L less than 35%. • Medium plasticity – w_L between 35% and 50%. • High plasticity – w_L greater than 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM	TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.		SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.		TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.		TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.		INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

Certificate of Analysis

Coffey Geotechnics Pty Ltd
Unit 1 18 Hurley Dve
Coffs Harbour
NSW 2450



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: **Andrew Ballard**

Report **435499-S**
Project name GEOTCOFH02820AG
Received Date Oct 16, 2014

Client Sample ID			BH5_7.2	BH5_7.5	BH5A_5.4	BH5A_5.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11192	S14-Oc11193	S14-Oc11194	S14-Oc11195
Date Sampled			Oct 09, 2014	Oct 09, 2014	Oct 09, 2014	Oct 09, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	15	7.8	12	7.2
% Moisture	0.1	%	17	7.5	19	19

Client Sample ID			BH5B_7.9	BH5B_8.3	BH5D_7	BH5D_7.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11196	S14-Oc11197	S14-Oc11198	S14-Oc11199
Date Sampled			Oct 09, 2014	Oct 09, 2014	Oct 09, 2014	Oct 09, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	4.1	18	6.0	8.3
% Moisture	0.1	%	18	15	22	20

Client Sample ID			BH7A_6.4	BH7A_6.7	BH7A_7	BH7B_7.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11200	S14-Oc11201	S14-Oc11202	S14-Oc11203
Date Sampled			Oct 10, 2014	Oct 10, 2014	Oct 10, 2014	Oct 10, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	18	30	15	60
% Moisture	0.1	%	20	20	25	28

Client Sample ID			BH7B_7.8	BH7B_8.1	BH7C_7.2	BH7C_7.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11204	S14-Oc11205	S14-Oc11206	S14-Oc11207
Date Sampled			Oct 10, 2014	Oct 10, 2014	Oct 10, 2014	Oct 10, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	72	13	53	24
% Moisture	0.1	%	24	22	22	22

Client Sample ID			BH7C_7.8	BH7D_6.9	BH7D_7.25	BH7D_7.6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11208	S14-Oc11209	S14-Oc11210	S14-Oc11211
Date Sampled			Oct 10, 2014	Oct 10, 2014	Oct 10, 2014	Oct 10, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	10	11	25	12
% Moisture	0.1	%	26	20	26	25

Client Sample ID			BH33_10.2	BH33_10.6	BH33A_10.3	BH33A_10.6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11212	S14-Oc11213	S14-Oc11214	S14-Oc11215
Date Sampled			Oct 14, 2014	Oct 14, 2014	Oct 14, 2014	Oct 14, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	4.3	11	38	13
% Moisture	0.1	%	19	20	21	22

Client Sample ID			BH33A_10.9	BH33C_11	BH33C_11.4	BH33C_11.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11216	S14-Oc11217	S14-Oc11218	S14-Oc11219
Date Sampled			Oct 14, 2014	Oct 13, 2014	Oct 13, 2014	Oct 13, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	10	150	16	8.8
% Moisture	0.1	%	24	26	22	25

Client Sample ID			BH34A_11.9	BH34A_12.3	BH34A_12.6	BH34B_10.9
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11220	S14-Oc11221	S14-Oc11222	S14-Oc11223
Date Sampled			Oct 13, 2014	Oct 13, 2014	Oct 13, 2014	Oct 14, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	12	76	6.0	13
% Moisture	0.1	%	20	24	19	20

Client Sample ID			BH34B_11.35	BH34B_11.8	BH34C_10.6	BH34C_10.9
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11224	S14-Oc11225	S14-Oc11226	S14-Oc11227
Date Sampled			Oct 14, 2014	Oct 14, 2014	Oct 13, 2014	Oct 13, 2014
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	120	7.4	38	65
% Moisture	0.1	%	22	22	22	25

Client Sample ID			BH34C_11.2	QC7	QC9	QC13
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S14-Oc11228	S14-Oc11229	S14-Oc11230	S14-Oc11231
Date Sampled			Oct 13, 2014	Not Provided	Not Provided	Not Provided
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	6.2	46	10	4.0
% Moisture	0.1	%	21	21	19	19

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Oct 16, 2014	180 Day
- Method: E022 Acid Extractable metals in Soils			
% Moisture	Sydney	Oct 16, 2014	28 Day
- Method: E005 Moisture Content			

Company Name: Coffey Geotechnics Pty Ltd COFFS
Address: Unit 1 18 Hurley Dve
Coffs Harbour
NSW 2450
Project Name: GEOTCOFH02820AG

Order No.: CH064625
Report #: 435499
Phone: 02 6651 3213
Fax: 02 6651 5194

Received: Oct 16, 2014 9:00 AM
Due: Oct 20, 2014
Priority: 2 Day
Contact Name: Andrew Ballard

Eurofins | mgt Client Manager: Tammy Lakeland

Sample Detail					% Moisture	Arsenic
Laboratory where analysis is conducted						
Melbourne Laboratory - NATA Site # 1254 & 14271						
Sydney Laboratory - NATA Site # 18217					X	X
Brisbane Laboratory - NATA Site # 20794						
External Laboratory						
Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
BH5_7.2	Oct 09, 2014		Soil	S14-Oc11192	X	X
BH5_7.5	Oct 09, 2014		Soil	S14-Oc11193	X	X
BH5A_5.4	Oct 09, 2014		Soil	S14-Oc11194	X	X
BH5A_5.7	Oct 09, 2014		Soil	S14-Oc11195	X	X
BH5B_7.9	Oct 09, 2014		Soil	S14-Oc11196	X	X
BH5B_8.3	Oct 09, 2014		Soil	S14-Oc11197	X	X
BH5D_7	Oct 09, 2014		Soil	S14-Oc11198	X	X
BH5D_7.3	Oct 09, 2014		Soil	S14-Oc11199	X	X
BH7A_6.4	Oct 10, 2014		Soil	S14-Oc11200	X	X
BH7A_6.7	Oct 10, 2014		Soil	S14-Oc11201	X	X

Company Name: Coffey Geotechnics Pty Ltd COFFS
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Sample Detail					% Moisture	Arsenic
Laboratory where analysis is conducted						
Melbourne Laboratory - NATA Site # 1254 & 14271						
Sydney Laboratory - NATA Site # 18217					X	X
Brisbane Laboratory - NATA Site # 20794						
External Laboratory						
BH7A_7	Oct 10, 2014		Soil	S14-Oc11202	X	X
BH7B_7.5	Oct 10, 2014		Soil	S14-Oc11203	X	X
BH7B_7.8	Oct 10, 2014		Soil	S14-Oc11204	X	X
BH7B_8.1	Oct 10, 2014		Soil	S14-Oc11205	X	X
BH7C_7.2	Oct 10, 2014		Soil	S14-Oc11206	X	X
BH7C_7.5	Oct 10, 2014		Soil	S14-Oc11207	X	X
BH7C_7.8	Oct 10, 2014		Soil	S14-Oc11208	X	X
BH7D_6.9	Oct 10, 2014		Soil	S14-Oc11209	X	X
BH7D_7.25	Oct 10, 2014		Soil	S14-Oc11210	X	X
BH7D_7.6	Oct 10, 2014		Soil	S14-Oc11211	X	X
BH33_10.2	Oct 14, 2014		Soil	S14-Oc11212	X	X

Company Name: Coffey Geotechnics Pty Ltd COFFS
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Coffs Harbour
NSW 2450
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Sample Detail					% Moisture	Arsenic
Laboratory where analysis is conducted						
Melbourne Laboratory - NATA Site # 1254 & 14271						
Sydney Laboratory - NATA Site # 18217					X	X
Brisbane Laboratory - NATA Site # 20794						
External Laboratory						
BH33_10.6	Oct 14, 2014		Soil	S14-Oc11213	X	X
BH33A_10.3	Oct 14, 2014		Soil	S14-Oc11214	X	X
BH33A_10.6	Oct 14, 2014		Soil	S14-Oc11215	X	X
BH33A_10.9	Oct 14, 2014		Soil	S14-Oc11216	X	X
BH33C_11	Oct 13, 2014		Soil	S14-Oc11217	X	X
BH33C_11.4	Oct 13, 2014		Soil	S14-Oc11218	X	X
BH33C_11.7	Oct 13, 2014		Soil	S14-Oc11219	X	X
BH34A_11.9	Oct 13, 2014		Soil	S14-Oc11220	X	X
BH34A_12.3	Oct 13, 2014		Soil	S14-Oc11221	X	X
BH34A_12.6	Oct 13, 2014		Soil	S14-Oc11222	X	X
BH34B_10.9	Oct 14, 2014		Soil	S14-Oc11223	X	X

Company Name: Coffey Geotechnics Pty Ltd COFFS
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NSW 2450
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Order No.: CH064625
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Received: Oct 16, 2014 9:00 AM
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Sample Detail					% Moisture	Arsenic
Laboratory where analysis is conducted						
Melbourne Laboratory - NATA Site # 1254 & 14271						
Sydney Laboratory - NATA Site # 18217					X	X
Brisbane Laboratory - NATA Site # 20794						
External Laboratory						
BH34B_11.35	Oct 14, 2014		Soil	S14-Oc11224	X	X
BH34B_11.8	Oct 14, 2014		Soil	S14-Oc11225	X	X
BH34C_10.6	Oct 13, 2014		Soil	S14-Oc11226	X	X
BH34C_10.9	Oct 13, 2014		Soil	S14-Oc11227	X	X
BH34C_11.2	Oct 13, 2014		Soil	S14-Oc11228	X	X
QC7	Not Provided		Soil	S14-Oc11229	X	X
QC9	Not Provided		Soil	S14-Oc11230	X	X
QC13	Not Provided		Soil	S14-Oc11231	X	X

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic			mg/kg	< 2			2	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	102			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals									
Arsenic				Result 1					
S14-Oc11193			CP	%	99		70-130	Pass	
Spike - % Recovery									
Heavy Metals									
Arsenic				Result 1					
S14-Oc11223			CP	%	113		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals									
Arsenic				Result 1	Result 2	RPD			
S14-Oc11192			CP	mg/kg	15	12	20	30%	Pass
Duplicate									
Heavy Metals									
Arsenic				Result 1	Result 2	RPD			
S14-Oc11202			CP	mg/kg	15	21	33	30%	Fail
Duplicate									
Heavy Metals									
Arsenic				Result 1	Result 2	RPD			
S14-Oc11212			CP	mg/kg	4.3	4.3	<1	30%	Pass
Duplicate									
Heavy Metals									
Arsenic				Result 1	Result 2	RPD			
S14-Oc11222			CP	mg/kg	6.0	4.7	24	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins mgt's Acceptance Criteria as stipulated in SOP 05. Refer to Glossary Page of this report for further details

Authorised By

Mary Makarios	Analytical Services Manager
Bob Symons	Senior Analyst-Inorganic (NSW)
Ivan Taylor	Senior Analyst-Metal (NSW)



Glenn Jackson

National Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Eurofins | mgt shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins | mgt be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Certificate of Analysis

Coffey Geotechnics Pty Ltd
Unit 1 18 Hurley Dve
Coffs Harbour
NSW 2450



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: **Joel Parkin**

Report **435646-S**
Project name GEOTCOFH02820AG
Received Date Oct 17, 2014

Client Sample ID			QC8	QC10	QC14
Sample Matrix			Soil	Soil	Soil
Eurofins mgt Sample No.			M14-Oc12156	M14-Oc12157	M14-Oc12158
Date Sampled			Not Provided	Not Provided	Not Provided
Test/Reference	LOR	Unit			
Heavy Metals					
Arsenic	2	mg/kg	18	13	< 2
% Moisture	0.1	%	21	19	20

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Melbourne	Oct 17, 2014	180 Day
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Oct 17, 2014	14 Day
- Method: Method 102 - ANZECC - % Moisture			

Company Name: Coffey Geotechnics Pty Ltd COFFS
Address: Unit 1 18 Hurley Dve
Coffs Harbour
NSW 2450
Project Name: GEOTCOFH02820AG

Order No.:
Report #: 435646
Phone: 02 6651 3213
Fax: 02 6651 5194

Received: Oct 17, 2014 8:23 AM
Due: Oct 21, 2014
Priority: 2 Day
Contact Name: Joel Parkin

Eurofins | mgt Client Manager: Mary Makarios

Sample Detail					% Moisture	Arsenic
Laboratory where analysis is conducted						
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X
Sydney Laboratory - NATA Site # 18217						
Brisbane Laboratory - NATA Site # 20794						
External Laboratory						
Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
QC8	Not Provided		Soil	M14-Oc12156	X	X
QC10	Not Provided		Soil	M14-Oc12157	X	X
QC14	Not Provided		Soil	M14-Oc12158	X	X

Eurofins | mgt Internal Quality Control Review and Glossary

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Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

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TERMS

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ASLP	Australian Standard Leaching Procedure (AS4439.3)
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COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
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QC DATA GENERAL COMMENTS

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3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
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Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Heavy Metals										
Arsenic				mg/kg	< 2			2	Pass	
LCS - % Recovery										
Heavy Metals										
Arsenic				%	84			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
Heavy Metals										
Arsenic	M14-Oc11586	NCP	mg/kg	< 2	< 2	<1		30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	No
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Mary Makarios	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)



Glenn Jackson

National Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Eurofins | mgt shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins | mgt be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Sample Receipt Advice

Company name: **Coffey Geotechnics Pty Ltd COFFS**

Contact name: Andrew Ballard
Project name: GEOTCOFH02820AG
COC number: Not provided
Turn around time: 5 Day
Date/Time received: Oct 16, 2014 9:00 AM
Eurofins | mgt reference: **435499**

Sample information

- ☒ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☒ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt
Sample Receipt : 7 degrees Celsius.
- ☒ All samples have been received as described on the above COC.
- ☒ COC has been completed correctly.
- ☒ Attempt to chill was evident.
- ☒ Appropriately preserved sample containers have been used.
- ☒ All samples were received in good condition.
- ☒ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☒ Appropriate sample containers have been used.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

QC8, QC10 and QC14 forwarded to Eurofin | mgt Melbourne

Contact notes

If you have any questions with respect to these samples please contact:

Tammy Lakeland on Phone : (+61) (3) 8564 5000 or by e.mail:
TammyLakeland@eurofins.com.au

Results will be delivered electronically via e.mail to Andrew Ballard - andrew.ballard@coffey.com.

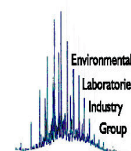
Eurofins | mgt Sample Receipt



Environmental Laboratory
Air Analysis
Water Analysis
Soil Contamination Analysis

NATA Accreditation
Stack Emission Sampling & Analysis
Trade Waste Sampling & Analysis
Groundwater Sampling & Analysis

38 Years of Environmental Analysis & Experience



4
#430799

Chain of Custody				Laboratory Quotation/ Order No:				Project No.: GEOTCOFH02820AG				Sheet 1 of 3							
Dispatch to:				Sampled By:				Coffey Purchase Order No.				CH064625							
Eurofins/ mgt				JP				Consigning Officer				TOLL							
								Date Dispatched				15-Oct-14							
Attention:				Project Manager: (report results to)				Courier Service:				TOLL							
Sample Receipt				<u>andrew.ballard@coffey.com</u> <u>joel.parkin@coffey.com</u>				Consignment Note No.:				M11 00903RGGAI							
Relinquished By: Coffey				Date:		Time:		Received By: <i>Ma H</i>				Date:		Time:					
Coffs Harbour												16/10/14		9:00					
Comments:	Sample Matrix	Container Type & Preservative	Sample No.	Sample Depth (m)	Date Sampled:	Analyses Required												Sample Condition on Receipt	
						Arsenic													Send to Melbourne
	Soil	250ml Glass Jar	BH5	7.2	9-Oct-14	x													
	Soil	250ml Glass Jar	BH5	7.5	9-Oct-14	x													
	Soil	250ml Glass Jar	BH5A	5.4	9-Oct-14	x													
	Soil	250ml Glass Jar	BH5A	5.7	9-Oct-14	x													
	Soil	250ml Glass Jar	BH5B	7.9	9-Oct-14	x													
	Soil	250ml Glass Jar	BH5B	8.3	9-Oct-14	x													
	Soil	250ml Glass Jar	BH5D	7	9-Oct-14	x													
	Soil	250ml Glass Jar	BH5D	7.3	9-Oct-14	x													
	Soil	250ml Glass Jar	BH7A	6.4	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7A	6.7	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7A	7	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7B	7.5	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7B	7.8	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7B	8.1	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7C	7.2	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7C	7.5	10-Oct-14	x													
	Soil	250ml Glass Jar	BH7C	7.8	10-Oct-14	x													

Special Laboratory Instructions:

Detection Limits: Normal Turnaround Required: Standard (5day TAT)

435169

Chain of Custody						Laboratory Quotation/ Order No:						Project No.: GEOTCOFH02820AG				Sheet 2 of 3							
Dispatch to:			Eurofins/ mgt			Sampled By:			JP			Consigning Officer				TOLL							
Attention:			Sample Receipt			Project Manager: (report results to)			andrew.ballard@coffey.com joel.parkin@coffey.com			Date Dispatched				15-Oct-14							
Relinquished By:			Coffey			Date:			Time:			Received By:				Date:							
			Coffs Harbour									Mutt				16/10/14 1:00							
Comments	Sample Matrix	Container Type & Preservative	Sample No.	Sample Depth (m)	Date Sampled:	Analyses Required												Send to Melbourne	HOLD	Sample Condition on Receipt			
						Arsenic																	
	Soil	250ml Glass Jar	BH7D	6.9	10-Oct-14	x																	
	Soil	250ml Glass Jar	BH7D	7.25	10-Oct-14	x																	
	Soil	250ml Glass Jar	BH7D	7.6	10-Oct-14	x																	
	Soil	250ml Glass Jar	BH33	10.2	14-Oct-14	x																	
	Soil	250ml Glass Jar	BH33	10.6	14-Oct-14	x																	
	Soil	250ml Glass Jar	BH33A	10.3	14-Oct-14	x																	
	Soil	250ml Glass Jar	BH33A	10.6	14-Oct-14	x																	
	Soil	250ml Glass Jar	BH33A	10.9	14-Oct-14	x																	
	Soil	250ml Glass Jar	BH33C	11	13-Oct-14	x																	
	Soil	250ml Glass Jar	BH33C	11.4	13-Oct-14	x																	
	Soil	250ml Glass Jar	BH33C	11.7	13-Oct-14	x																	
	Soil	250ml Glass Jar	BH34A	11.9	13-Oct-14	x																	
	Soil	250ml Glass Jar	BH34A	12.3	13-Oct-14	x																	
	Soil	250ml Glass Jar	BH34A	12.6	13-Oct-14	x																	
	Soil	250ml Glass Jar	BH34B	10.9	14-Oct-14	x																	
	Soil	250ml Glass Jar	BH34B	11.35	14-Oct-14	x																	
	Soil	250ml Glass Jar	BH34B	11.8	14-Oct-14	x																	
Special Laboratory Instructions:																							
Detection Limits:						Normal						Turnaround Required:						Standard (5day TAT)					

#435499

Chain of Custody				Laboratory Quotation/ Order No:				Project No.: GEOTCOFH02820AG				Sheet 3 of 3						
Dispatch to:			Eurofins/ mgt			Sampled By:			JP			Consigning Officer		TOLL				
Attention:			Sample Receipt			Project Manager: (report results to)			andrew.ballard@coffey.com joel.parkin@coffey.com			Date Dispatched		15-Oct-14				
Relinquished By:			Coffey			Date:		Time:		Received By:				Date:		Time:		
			Coffs Harbour							Matt				15/10/14		9:00		
Comments:	Sample Matrix	Container Type & Preservative	Sample No.	Sample Depth (m)	Date Sampled:	Analyses Required												Sample Condition on Receipt
						Arsenic											Send to Melbourne	
	Soil	250ml Glass Jar	BH34C	10.6	13-Oct-14	x												
	Soil	250ml Glass Jar	BH34C	10.9	13-Oct-14	x												
	Soil	250ml Glass Jar	BH34C	11.2	13-Oct-14	x												
	Soil	250ml Glass Jar	QC7			x												
	Soil	250ml Glass Jar	QC8			x									x			
	Soil	250ml Glass Jar	QC9			x												
	Soil	250ml Glass Jar	QC10			x									x			
	Soil	250ml Glass Jar	QC13			x												
	Soil	250ml Glass Jar	QC14			x									x			
Special Laboratory Instructions:																		
Detection Limits: Normal Turnaround Required: Standard (5day TAT)																		

Appendix A

LFHJV ENM Sampling Plan and Laboratory Summary Results Tables

NORTH COAST DRILLING

CLIENT: Leighor - Fullon - Mayan

JOB No:

LOCATION: Woodganga To Sofice

DRILLING UNIT: Rig 3 - P-160

DRILLER: Brock - Kenny

2964

DAY	DATE	BH No.	DRILLING: Start - Finish			TRAVEL hours	DRILLED		SPT	U50	WATER CART	GRAVEL DRILLING m	REAM CASING m	MOVE SET-UP HOURS	VANE SHEAR	STAND-BY HOURS	CORE BOXES	E.O.H DEPTH	RETURN SUPPORT VEHICLE
			AM	PM	TOTAL HRS		Non-core m	Core m											
Wed	25-6		7am	10am															
Wed	25-6	04	11pm	4pm															
Thur	26/6	5-11	6:30am	4:30pm															
Fri	27/6	12-7	12:30pm	1:30pm															
TOTAL																			
DAILY	CHECK LIST	DRILL RIG	FIRE EXTINGUISH	FIRST AID KIT	SPILL KIT	TRUCK LIGHTS	TRUCK BRAKES	OIL LEAKS	TYRES WINCHES	COMPULS. SIGNS	HYDRAULIC OIL (RIG)	ENGINE OIL (RIG)	GEAR BOX OIL (HEAD)	APPROP. PPE	EMERGENCY STOP	MAST PINS			
25-6-14	Wed		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
26/6	Thur		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
27/6	Fri		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
SITE SPECIFIC HAZARDS:																			
			UNEVEN GROUND	BAD ACCESS	OVERHEAD POWER	SNAKE BITE	UNDERGROUND SERVICES	SLEPPY SURFACES	UNEVEN SURFACES	STEEP SURFACES	HOT CONDITIONS	COLD CONDITIONS	TRAFFIC ROAD	TRAFFIC SITE	DRILLER SIGNATURE	OFFSIDER SIGNATURE	SUPERVISOR SIGNATURE		
25-6-14	Wed		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
26/6	Thur		N	Y	N	Y	N	N	Y	Y	N	Y	N	Y	Y	✓	✓		
27/6	Fri		Y	Y	N	Y	N	N	Y	Y	N	Y	N	N	Y	✓	✓		

REMARKS: eg. reasons for standby, etc. 1hr standby checking hole locations.

CONSUMABLES: polymer, bits etc.

DATE: 27-6-2014 SUPERVISOR NAME: S. Seabrook

SUPERVISOR SIGNATURE: [Signature]

NORTH COAST DRILLING

CLIENT:

Leighlyn Fulton Horgan

2965

JOB No:

DRILLING UNIT:

LOCATION:

W25

DRILLER:

Craig

DAY	DATE	BH No.	DRILLING: Start - Finish			TRAVEL hours	DRILLED		SPT	U50	WATER CART	GRAVEL DRILLING m	REAM CASING m	MOVE SET-UP HOURS	VANE SHEAR	STAND-BY HOURS	CORE BOXES	E.O.H DEPTH	RETURN SUPPORT VEHICLE
			AM	PM	TOTAL HRS		Non-core m	Core m											
Mon	30/6	18-21	100m	4pm			32m		12		1			4				4.5	
Tue	1/7	22-23	6:00m	4:30pm			56m		21		1			7				4.5	
Wed	2/7	23-24	6:00m	5:30pm			69m		21		1			6				4.5	
Thurs	3/7	25-26	6:00m	5:30pm			60m		20		1			5				12.5	
TOTAL																			
DAILY CHECK LIST	DRILL RIG	FIRE EXTINGUISH	FIRST AID KIT	SPILL KIT	TRUCK LIGHTS	TRUCK BRAKES	OIL LEAKS	TYRES WINCHES	COMPULS. SIGNS	HYDRAULIC OIL (RIG)	ENGINE OIL (RIG)	GEAR BOX OIL (HEAD)	APPROP. PPE	EMERGENCY STOP	MAST PINS				
Mon 30/6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tue 1/7		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wed 2/7		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mon 30/6		Y	Y	N	Y	N	N	Y	N	N	N	N	N	11	Y	11	10	✓	✓
Tue 1/7		Y	Y	N	Y	N	N	Y	N	N	N	N	N	N	Y	11	10	✓	✓
Wed 2/7		Y	Y	N	Y	N	N	Y	N	N	N	N	N	N	Y	11	10	✓	✓
Thurs 3/7		Y	Y	N	Y	N	N	Y	N	N	N	N	N	N	Y	11	10	✓	✓
SITE SPECIFIC HAZARDS:			UNEVEN GROUND	BAD ACCESS	OVERHEAD POWER	SNAKE BITE	UNDERGRND SERVICES	SUPPERY SURFACES	UNEVEN SURFACES	STEEP SURFACES	HOT CONDITIONS	COLD CONDITIONS	TRAFFIC ROAD	TRAFFIC SITE	DRILLER SIGNATURE	OFFSIDER SIGNATURE	SUPERVISOR SIGNATURE		

REMARKS: eg. reasons for standby, etc.

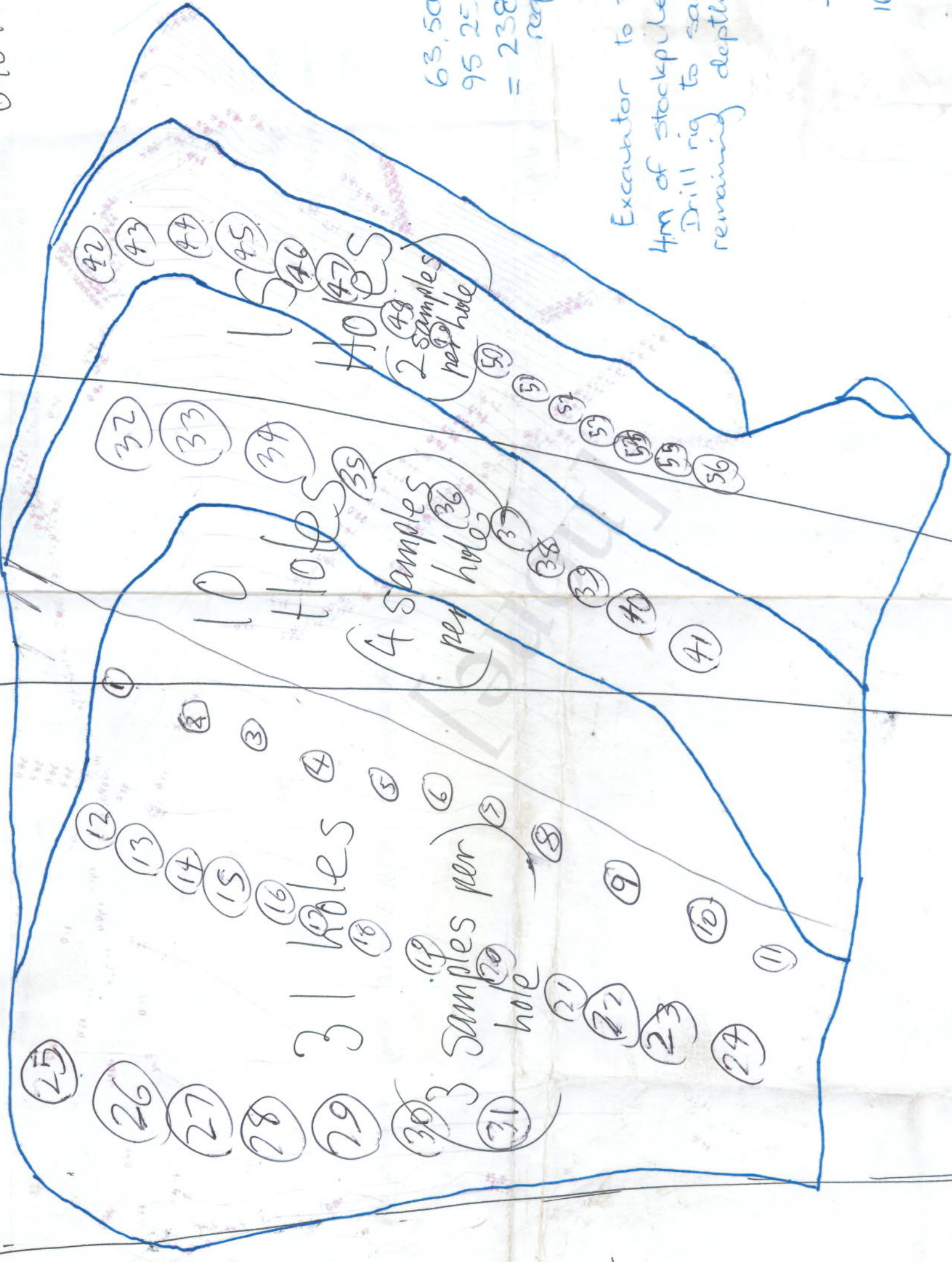
CONSUMABLES: polymer, bits etc.

DATE: 7-7-2014 SUPERVISOR NAME: S J ENKINS

SUPERVISOR SIGNATURE: [Signature]

SUPERVISOR SIGNATURE:

Chris Carman
0409 912 758



63,500m³
95 250 t
= 238 samples
required

Hole - Sample

Excavator to Test top
4m of stockpile ≈ 20000m³ = 75 samples
Drill rig to sample the
remaining depths ≈ 43,500m³
≈ 163 samples.

75 = 0.2, 4 @ 25 rigs.
163 = @ 56 rigs

Scale
HORZ 1:500
VERT 1:500
Chainage
Ch to Ch

Drawn
Designed
Checked
Project



Mountain Way
Stockpile Work As Execute

Drawn No. 1
Job No.
Issue

<u>Hole</u>	<u>Sample</u>	<u>Depth</u>	<u>Hole</u>	<u>Sample</u>	<u>Depth</u>
① 8m	1	6m	⑩ 8m	28	6m
	2	7m		29	7m
	3	8m		30	8m
②	4	6m	⑪ 8m	31	6m
	5	7m		32	7m
	6	8m		33	8m
③ 8m	7	6m	⑫ 8m	34	6m
	8	7m		35	7m
	9	8m		36	8m
④ 8m	10	6m	⑬ 8m	37	6m
	11	7m		38	7m
	12	8m		39	8m
⑤ 8m	13	6m	⑭ 8m	40	6m
	14	7m		41	7m
	15	8m		42	8m
⑥ 8m	16	6m	⑮ 8m	43	6m
	17	7m		44	7m
	18	8m		45	8m
⑦ 8m	19	6m	⑯ 8m	46	6m
	20	7m		47	7m
	21	8m		48	8m
⑧ 8m	22	6m	⑰ 8m	49	6m
	23	7m		50	7m
	24	8m		51	8m
⑨ 8m	25	6m	⑱ 8m	52	6m
	26	7m		53	7m
	27	8m		54	8m

Hole	Sample	Depth
(19)	55	6m
4m	56	7m
	57	8m

(20)	58	6m
4m	59	7m
	60	8m

(21)	61	6m
8m	62	7m
	63	8m

(22)	64	6m
4m	65	7m
	66	8m

(23)	67	6m
8m	68	7m
	69	8m

(24)	70	6m
6m	71	7m
	72	8m

(25)	73	6m
8m	74	7m
	75	8m

(26)	76	6m
6m	77	7m
	78	8m

(27)	79	6m
8m	80	7m
	81	8m

Hole	Sample	Depth
(28)	82	6m
4m	83	7m
	84	8m

(29)	85	6m
4m	86	7m
	87	8m

(30)	88	6m
4m	89	7m
	90	8m

(31)	91	6m
4m	92	7m
	93	8m

Section		2
---------	--	---

(32)	94	6m
12m	95	8m
	96	10m
	97	12m

(33)	98	6m
12m	99	6m
	100	10m
	101	12m

(34)	102	6m
12m	103	8m
	104	10m
	105	12m

(35)	106	6m
12m	107	8m
	108	10m
	109	12m

Hole	Sample	Depth
(36)	110	6m
12m	111	8m
	112	10m
	113	12m

(37)	114	6m
12m	115	8m
	116	10m
	117	12m

(38)	118	6m
12m	119	8m
	120	10m
	121	12m

(39)	122	6m
12m	123	8m
	124	10m
	125	12m

(40)	126	
12m	127	
	128	
	129	

(41)	130	
12m	131	
	132	
	133	

Section 3

(42)	134	
7m	135	

(43)	136	
7m	137	

Hole	Sample	Depth
(44)	138	5m
7m	139	7m

(45)	140	5m
7m	141	7m

(46)	142	5m
7m	143	7m

(47)	144	5m
7m	145	7m

(48)	146	5m
7m	147	7m

(49)	148	5m
7m	149	7m

(50)	150	5m
7m	151	7m

(51)	152	5m
7m	153	7m

(52)	154	5m
7m	155	7m

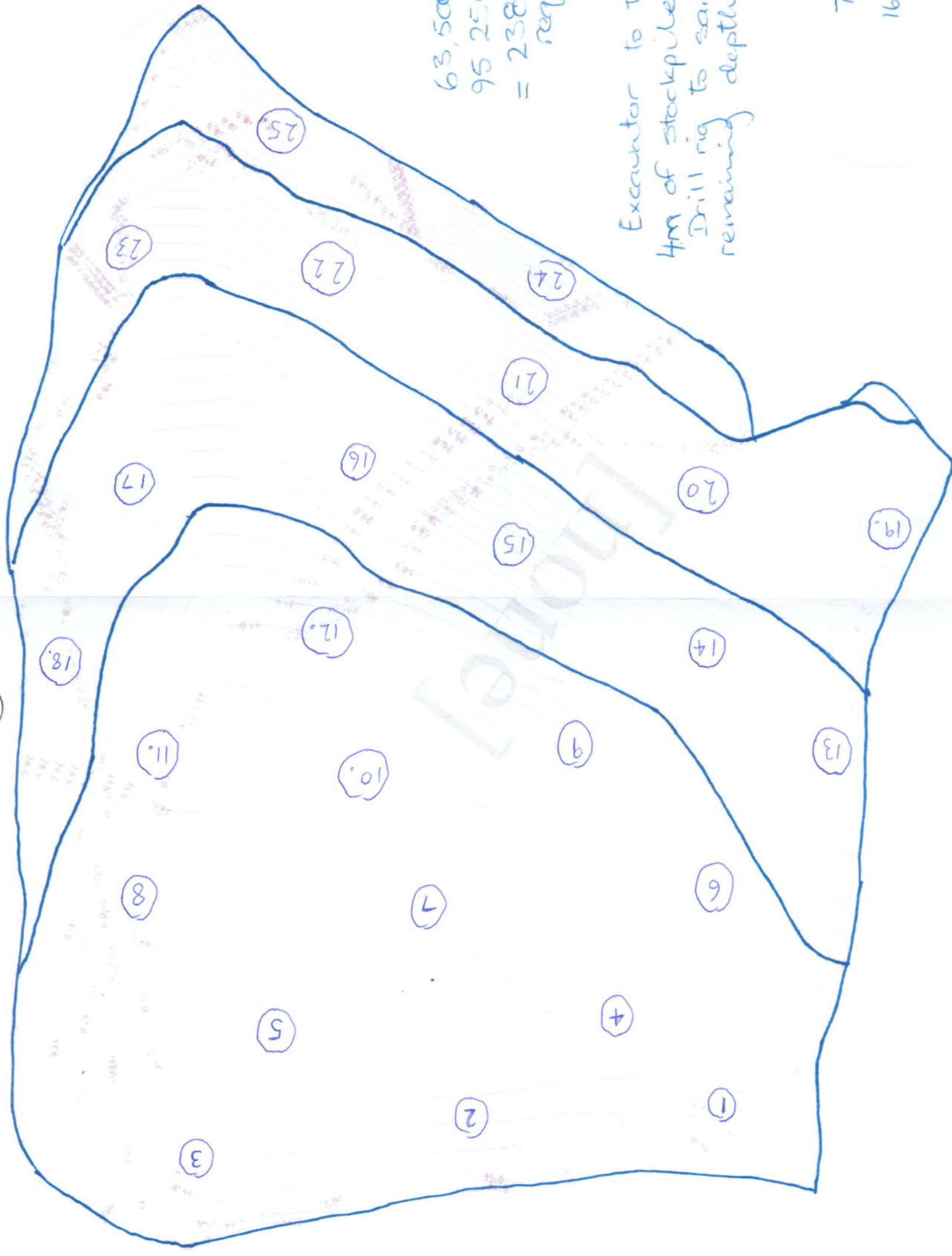
(53)	156	5m
7m	157	7m

(54)	158	5m
7m	159	7m

(55)	160	5m
7m	161	7m

(56)	162	5m
7m	163	7m

Excavator Samples 0-4m deep



63,500m³
95 250 t
= 238 samples
required

Excavator to test top
4m of stockpile $\approx 20000m^3 = 75$ samples
Drill rig to sample the
remaining depths $\approx 43,500m^3$
 ≈ 163 samples.

75 = 0, 2, 4 @ 25 TP
163 = @ 56 TP

Scale
HORZ 1:500
VERT 1:500
Ch to Ch

Drawn
Designed
Notified
Project



Title
Mountain Way
Stockpile Work As Execute

Dwg No. 1
Job No.
Issue

Hole	Sample (xz)	Depth (m)	Hole	Sample	Depth (m)
1.	~~75~~ 164 ~~74~~ 165 ~~73~~ 166	0m 2m 4m	10.	~~48~~ 191 ~~47~~ 192 ~~46~~ 193	0 2 4
2.	~~72~~ 167 ~~71~~ 168 ~~70~~ 169	0 2 4	11.	~~45~~ 194 ~~44~~ 195 ~~43~~ 196	0 2 4
3.	~~69~~ 170 ~~68~~ 171 ~~67~~ 172	0 2 4	12.	~~42~~ 197 ~~41~~ 198 ~~40~~ 199	0 2 4
4.	~~66~~ 173 ~~65~~ 174 ~~64~~ 175	0 2 4	13.	~~39~~ 200 ~~38~~ 201 ~~37~~ 202	0 2 4
5.	~~63~~ 176 ~~62~~ 177 ~~61~~ 178	0 2 4	14.	~~36~~ 203 ~~35~~ 204 ~~34~~ 205	0 2 4
6.	~~60~~ 179 ~~59~~ 180 ~~58~~ 181	0 2 4	15.	~~33~~ 206 ~~32~~ 207 ~~31~~ 208	0 2 4
7.	~~57~~ 182 ~~56~~ 183 ~~55~~ 184	0 2 4	16.	~~30~~ 209 ~~29~~ 210 ~~28~~ 211	0 2 4
8.	~~54~~ 185 ~~53~~ 186 ~~52~~ 187	0 2 4	17.	~~27~~ 212 ~~26~~ 213 ~~25~~ 214	0 2 4
9.	~~51~~ 188 ~~50~~ 189 ~~49~~ 190	0 2 4	18.	~~24~~ 215 ~~23~~ 216 ~~22~~ 217	0 2 4

Hole	Sample(x2)	Depth (m)	Hole	Sample(x2)	Depth (m)
19.	21 218 20 219 19 220	0m 2m 4m			
20.	221 18 201 222 17 216 223 16 215	0 2 4			
21.	224 15 214 225 14 213 226 13 212	0 2 4			
22.	227 12 211 228 11 210 229 10 209	0 2 4			
23.	230 9 208 231 8 207 232 7 206	0 2 4			
24.	233 6 205 234 5 204 235 4 203	0 2 4			
25.	236 3 202 237 2 201 238 1 200	0 2 4			

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 1 MeW 1	Sample 2 MeW 2	Sample 3 MeW 3	Sample 4 MeW 4	Sample 5 MeW 5	Sample 6 MeW 6	Sample 7 MeW 7	Sample 8 MeW 8	Sample 9 MeW 9	Sample 10 MeW 10	Sample 11 MeW 11	Sample 12 MeW 12	Sample 13 MeW 13	Sample 14 MeW 14	Sample 15 MeW 15	Sample 16 MeW 16	Sample 17 MeW 17
		Job No.	D4495/1	D4495/2	D4495/3	D4495/4	D4495/5	D4495/6	D4495/7	D4495/8	D4495/9	D4495/10	D4495/11	D4495/12	D4495/13	D4495/14	D4495/15	D4495/16	D4495/17
Moisture Content (% moisture)	..	Inhouse - 110° C	24	22	20	20	20	21	14	21	21	19	19	18	17	20	17	22	21
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	12	9	12	10	9	8	10	9	11	6	9	10	14	7	14	10	11
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	19	17	17	22	20	20	22	21	20	20	21	20	22	21	21	18	21
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	12	12	13	13	13	12	14	13	14	10	12	14	14	32	18	19	14
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	10	7	9	16	15	13	19	16	14	10	17	12	13	13	13	11	11
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	4	3	4	5	6	6	7	7	6	5	6	6	7	8	6	6	6
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	26	26	27	36	43	38	49	42	36	33	41	34	46	38	40	37	34
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	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	0.0	0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.16	0.12	0.21	0.25	0.19	0.19	0.08	0.16	0.16	0.07	0.11	0.13	0.08	0.08	0.14	0.10	0.10
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.88	5.86	5.89	5.70	5.83	5.76	6.32	5.98	5.68	6.35	6.23	5.86	6.38	6.16	5.47	6.39	6.32
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m-p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg))	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹⁻³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹⁻³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112521



NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005 (The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 18 MtW 18	Sample 19 MtW 19	Sample 20 MtW 20	Sample 21 MtW 21	Sample 22 MtW 22	Sample 23 MtW 23	Sample 24 MtW 24	Sample 25 MtW 25	Sample 26 MtW 26	Sample 27 MtW 27	Sample 28 MtW 28	Sample 29 MtW 29	Sample 30 MtW 30	Sample 31 MtW 31	Sample 32 MtW 32	Sample 33 MtW 33	Sample 34 MtW 34
		Job No.	D4495/18	D4495/19	D4495/20	D4495/21	D4495/22	D4495/23	D4495/24	D4495/25	D4495/26	D4495/27	D4495/28	D4495/29	D4495/30	D4495/31	D4495/32	D4495/33	D4495/34
Moisture Content (% moisture)	..	Inhouse - 110° C	24	21	23	24	22	23	27	24	26	26	25	33	27	27	21	25	20
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	23	13	43	37	17	36	34	40	38	18	23	20	19	26	19	16	7
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	20	19	23	19	23	21	19	22	19	13	19	17	18	22	15	22	15
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	17	13	10	7	13	30	11	9	14	12	17	10	15	14	17	17	17
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	12	13	13	9	13	10	10	12	11	6	14	15	10	15	8	9	7
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	4	6	4	3	5	4	4	4	3	5	7	4	7	4	3	4	4
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	36	37	40	37	39	35	35	36	34	19	39	42	33	44	27	36	23
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.08	0.10	0.13	0.13	0.22	0.09	0.12	0.11	0.10	0.12	0.11	0.71	0.13	0.26	0.79	0.18	0.11
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.83	6.20	6.38	6.48	5.67	6.23	6.15	6.35	6.14	5.61	6.21	5.07	5.68	5.78	5.41	6.16	6.17
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b)&(k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg))	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112521

NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
(The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 35 MtW 35	Sample 36 MtW 36	Sample 37 MtW 37	Sample 38 MtW 38	Sample 39 MtW 39	Sample 40 MtW 40	Sample 41 MtW 41	Sample 42 MtW 42	Sample 43 MtW 43	Sample 44 MtW 44	Sample 45 MtW 45	Sample 46 MtW 46	Sample 47 MtW 47	Sample 48 MtW 48	Sample 49 MtW 49	Sample 50 MtW 50	Sample 51 MtW 51
		Job No.	D4495/35	D4495/36	D4495/37	D4495/38	D4495/39	D4495/40	D4495/41	D4495/42	D4495/43	D4495/44	D4495/45	D4495/46	D4495/47	D4495/48	D4495/49	D4495/50	D4495/51
Moisture Content (% moisture)	..	Inhouse - 110° C	22	20	22	28	25	20	28	32	23	23	22	21	20	22	22	20	18
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	11	7	8	10	12	9	12	11	10	22	12	12	10	11	9	13	9
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	17	20	18	14	21	16	18	18	20	19	22	21	17	19	22	18	18
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	16	13	14	13	16	14	17	15	15	15	19	16	18	18	22	18	18
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	7	14	8	6	23	9	9	9	8	9	8	8	7	10	7	8	9
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	4	6	4	3	5	4	4	4	5	4	4	4	4	6	5	5	6
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	27	32	30	23	29	29	26	33	29	31	29	28	26	34	29	30	31
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	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
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.09	0.15	0.09	0.12	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.13	0.11	0.10	0.09	0.15
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.69	5.47	5.96	6.17	5.81	6.09	6.01	6.05	6.21	6.02	5.98	6.16	5.97	5.61	6.06	5.65	5.71
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1
Pyrene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.9	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m-p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112521

NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
(The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 52 MtW 164	Sample 53 MtW 165	Sample 54 MtW 166	Sample 55 MtW 167	Sample 56 MtW 168	Sample 57 MtW 169	Sample 58 MtW 170	Sample 59 MtW 171	Sample 60 MtW 172	Sample 61 MtW 173	Sample 62 MtW 174	Sample 63 MtW 175	Sample 64 MtW 176	Sample 65 MtW 177	Sample 66 MtW 178	Sample 67 MtW 179	Sample 68 MtW 180
		Job No.	D4495/52	D4495/53	D4495/54	D4495/55	D4495/56	D4495/57	D4495/58	D4495/59	D4495/60	D4495/61	D4495/62	D4495/63	D4495/64	D4495/65	D4495/66	D4495/67	D4495/68
Moisture Content (% moisture)	..	Inhouse - 110° C	13	16	14	4	10	10	11	22	20	12	21	16	10	22	23	13	23
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	11	11	9	13	3	7	9	23	14	10	9	10	14	14	80	11	8
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	20	20	13	23	18	15	17	28	21	20	14	17	22	22	19	23	17
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	17	14	8	15	10	13	12	11	17	18	18	14	14	13	14	12	12
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	14	18	13	23	41	24	11	12	21	16	9	13	19	17	15	24	13
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	6	7	3	8	5	5	5	6	5	7	5	6	7	10	7	9	6
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	38	50	28	55	58	54	35	46	62	40	30	29	47	56	51	59	33
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.12	0.13	0.06	0.34	0.03	0.06	0.16	0.07	0.07	0.47	0.07	0.13	0.34	0.20	0.07	0.13	0.06
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.67	5.99	5.10	5.54	5.52	5.26	5.57	6.07	5.34	5.23	5.65	5.26	5.65	4.94	6.31	5.94	6.02
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg))	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112521

NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
(The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 69 MtW 181	Sample 70 MtW 182	Sample 71 MtW 183	Sample 72 MtW 184	Sample 73 MtW 185	Sample 74 MtW 186	Sample 75 MtW 187	Sample 76 MtW 188	Sample 77 MtW 189	Sample 78 MtW 190	Sample 79 MtW 191	Sample 80 MtW 192	Sample 81 MtW 193	Sample 82 MtW 194	Sample 83 MtW 195	Sample 84 MtW 196	Sample 85 MtW 197
		Job No.	D4495/69	D4495/70	D4495/71	D4495/72	D4495/73	D4495/74	D4495/75	D4495/76	D4495/77	D4495/78	D4495/79	D4495/80	D4495/81	D4495/82	D4495/83	D4495/84	D4495/85
Moisture Content (% moisture)	..	Inhouse - 110° C	16	14	16	17	10	20	23	16	22	22	11	20	18	9	23	12	6
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	13	19	23	17	17	20	15	10	16	30	10	10	11	11	8	11	11
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	17	20	20	20	17	28	24	23	21	24	21	22	19	23	27	35	23
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	12	12	14	14	13	17	13	17	22	14	15	17	14	9	10	14	14
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	26	14	15	18	11	11	11	18	15	14	13	10	9	17	13	16	24
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	7	5	6	6	4	6	4	7	5	7	6	5	5	7	4	5	9
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	59	44	44	50	31	43	35	51	45	46	39	38	31	50	48	43	59
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.11	0.17	0.15	0.16	0.18	0.07	0.07	0.27	0.10	0.10	0.20	0.11	0.06	0.20	0.07	0.10	0.21
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.16	5.67	5.99	5.54	5.76	6.00	5.92	5.81	6.01	6.07	5.89	6.64	5.65	5.97	6.43	6.28	5.95
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b)&(k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.7	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg))	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112521

NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
(The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 86 MtW 198	Sample 87 MtW 199	Sample 88 MtW 200	Sample 89 MtW 201	Sample 90 MtW 202	Sample 91 MtW 203	Sample 92 MtW 204	Sample 93 MtW 205	Sample 94 MtW 206	Sample 95 MtW 207	Sample 96 MtW 208	Sample 97 MtW 209	Sample 98 MtW 210	Sample 99 MtW 211	Sample 100 MtW 212	Sample 101 MtW 213	Sample 102 MtW 214
		Job No.	D4495/86	D4495/87	D4495/88	D4495/89	D4495/90	D4495/91	D4495/92	D4495/93	D4495/94	D4495/95	D4495/96	D4495/97	D4495/98	D4495/99	D4495/100	D4495/101	D4495/102
Moisture Content (% moisture)	..	Inhouse - 110° C	22	23	10	21	17	3	19	19	5	18	17	3	22	21	6	15	23
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	13	10	14	10	13	14	7	10	18	11	13	11	10	13	9	10	7
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	25	24	18	18	21	21	17	15	19	22	23	23	12	15	20	23	12
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	14	13	13	12	14	19	10	11	13	13	16	14	13	16	15	17	26
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	20	20	13	12	17	15	4	4	11	21	23	12	8	5	16	19	11
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	10	10	5	5	6	7	3	3	5	7	8	5	4	3	7	7	6
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	52	48	38	41	44	43	19	19	35	49	56	39	33	18	42	47	25
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.06	0.06	0.31	0.22	0.18	0.21	0.09	0.10	0.29	0.15	0.15	0.21	0.07	0.13	0.30	0.27	0.08
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	6.37	6.26	5.54	5.88	6.13	5.47	5.91	5.96	5.77	6.11	6.02	5.88	6.24	6.60	5.73	6.62	6.27
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m-p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg))	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112521

NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
(The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
 Analysis requested by James Diamond. Your Project: C280-241
 (Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 103 MtW 215	Sample 104 MtW 216	Sample 105 MtW 217	Sample 106 MtW 218	Sample 107 MtW 219	Sample 108 MtW 220	Sample 109 MtW 221	Sample 110 MtW 222	Sample 111 MtW 223	Sample 112 MtW 224	Sample 113 MtW 225	Sample 114 MtW 226	Sample 115 MtW 227	Sample 116 MtW 228	Sample 117 MtW 229	Sample 118 MtW 230	Sample 119 MtW 231
		Job No.	D4495/103	D4495/104	D4495/105	D4495/106	D4495/107	D4495/108	D4495/109	D4495/110	D4495/111	D4495/112	D4495/113	D4495/114	D4495/115	D4495/116	D4495/117	D4495/118	D4495/119
Moisture Content (% moisture)	..	Inhouse - 110° C	7	17	19	7	21	13	10	16	16	6	20	21	4	24	27	8	19
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	11	10	16	10	12	10	10	10	10	9	9	9	8	7	6	11	12
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	21	19	19	20	21	21	20	22	23	23	26	21	19	15	15	23	18
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	17	11	13	13	9	14	13	12	14	14	12	16	16	13	25	14	18
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	13	12	13	13	12	17	13	22	24	20	17	14	12	6	10	19	13
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	6	5	6	5	4	7	5	7	9	8	10	7	6	3	8	7	4
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	35	39	41	36	40	46	44	53	61	50	56	39	35	21	26	49	23
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.11	0.21	0.24	0.36	0.24	0.20	0.16	0.12	0.13	0.28	0.17	0.20	0.25	0.07	0.06	0.66	0.11
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.98	6.12	6.70	5.76	7.08	6.96	5.82	6.00	6.34	5.91	6.14	5.61	5.86	6.17	6.14	6.14	5.50
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	C	<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
Acenaphthylene (mg/Kg)	..	C	<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
Acenaphthene (mg/Kg)	..	C	<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
Fluorene (mg/Kg)	..	C	<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
Phenanthrene (mg/Kg)	..	C	0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene (mg/Kg)	..	C	<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
Fluoranthene (mg/Kg)	..	C	0.2	0.2	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene (mg/Kg)	..	C	0.2	0.2	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene (mg/Kg)	..	C	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene (mg/Kg)	..	C	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)&(k)fluoranthene (mg/Kg)	..	C	<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	C	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene (mg/Kg)	..	C	<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
Benzo(g,h,i)perylene (mg/Kg)	..	C	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sum of reported PAHs (mg/Kg)	11	C	0.6	0.5	3.1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.5	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	C	0.1	0.1	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	C	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	C	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	C	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m-p-Xylene (mg/Kg)	16	C	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg))	..	C	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	C	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	C	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	C	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	C	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
 b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
 c. Analysis sub-contracted - Envirolab Report No. 112521

NOTES

1. DIW = Dry Weight. na = no guidelines available
 2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
 (The Excavation Natural Material Exemption 2012)
 3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
 4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

126 samples supplied by Leighton Fulton Hogan Joint Venture on the 1st July, 2014. Job Number: D4495
 Analysis requested by James Diamond. **Your Project: C280-241**
 (Po Box 9090, MOONEE BEACH NSW 2450).

	SZW ENM Number	Method	Sample 120 MtW 232	Sample 121 MtW 233	Sample 122 MtW 234	Sample 123 MtW 235	Sample 124 MtW 236	Sample 125 MtW 237	Sample 126 MtW 238	MIN	MAX	AVERAGE	ENM - Col 2 AVERAGE	ENM - Col 3 MAX
		Job No.	D4495/120	D4495/121	D4495/122	D4495/123	D4495/124	D4495/125	D4495/126				see note 2	see note 2
Moisture Content (% moisture)	..	Inhouse - 110 °C	21	11	20	14	7	16	20	3	33	18	..	..
METALS														
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPMs	9	10	9	11	10	30	6	3	80	14	20	40
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPMs	23	22	20	22	20	22	22	12	35	20	50	100
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPMs	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	0.1	<0.1	0.5	1.0
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPMs	14	13	12	10	15	13	12	7	32	14	75	150
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPMs	24	13	14	13	18	16	14	4	41	14	100	200
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPMs	9	5	5	6	7	5	7	3	10	6	30	60
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPMs	70	37	34	40	46	37	38	18	70	39	150	300
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPMs	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.2	0.08	0.5	1.0
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 4B1	0.18	0.19	0.07	0.07	0.41	0.08	0.05	0.03	0.79	0.16	1.5	3.0
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.92	5.75	6.19	6.59	5.96	6.09	6.27	4.94	7.08	5.95	5 - 9	4.5 - 10
Polycyclic Aromatic Hydrocarbons (PAH)														
Naphthalene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	..	..	..
Acenaphthylene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	..	..	..
Acenaphthene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	..	..	..
Fluorene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	..	..	..
Phenanthrene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	..	..	..
Anthracene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	..	..	..
Fluoranthene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0	..	..	..
Pyrene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	..	..	..
Benz(a)anthracene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	..	..	..
Chrysene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	..	..	..
Benzo(b,k,l)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	..	..	..
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	..	..	..
Dibenz(a,h)anthracene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	..	..	..
Benzo(g,h,i)perylene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	..	..	..
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	5.0	<1.0	20	40
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.4	<0.5	0.5	1.0
HYDROCARBON ANALYSIS RESULTS														
BTEX														
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	..	..	0.5
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	..	..	65
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	..	..	25
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	..	..	15
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	..	..	..
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	..	..	..
Total Recoverable Hydrocarbons														
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..	..
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<250	250	500
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..	..
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..	..
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPMs
 b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
 c. Analysis sub-contracted - Envirolab Report No. 112521

NOTES

1. DW = Dry Weight. na = no guidelines available
 2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
 (The Excavation Natural Material Exemption 2012)
 3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
 4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

113 samples supplied by Leighton Fulton Hogan Joint Venture on the 9th July, 2014. Job Number: D4685
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 1 MtW 52	Sample 2 MtW 53	Sample 3 MtW 54	Sample 4 MtW 55	Sample 5 MtW 56	Sample 6 MtW 57	Sample 7 MtW 58	Sample 8 MtW 59	Sample 9 MtW 60	Sample 10 MtW 61	Sample 11 MtW 62	Sample 12 MtW 63	Sample 13 MtW 64	Sample 14 MtW 65	Sample 15 MtW 66	Sample 16 MtW 67	Sample 17 MtW 68
		Job No.	D4685/1	D4685/2	D4685/3	D4685/4	D4685/5	D4685/6	D4685/7	D4685/8	D4685/9	D4685/10	D4685/11	D4685/12	D4685/13	D4685/14	D4685/15	D4685/16	D4685/17
Moisture Content (% moisture)	..	Inhouse - 110° C	21	20	21	21	18	21	21	25	26	23	21	22	19	20	21	22	22
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<1	9	9	10	11	8	8	12	14	19	11	25	10	33	51	25	17
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<1	19	19	21	20	17	14	22	28	31	21	28	33	33	26	20	22
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<1	16	18	17	13	12	13	19	18	16	15	16	18	17	26	14	15
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<1	10	11	12	6	5	7	16	15	12	12	13	11	13	13	12	15
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<1	4	6	6	3	3	4	7	5	4	4	5	4	4	5	4	5
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<1	29	29	37	28	20	26	43	43	43	36	52	52	46	172	35	41
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 4B1	0.09	0.11	0.10	0.16	0.12	0.10	0.12	1.04	0.29	0.18	0.16	0.13	0.10	0.08	0.10	0.06	0.06
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.85	5.78	5.30	5.08	6.13	6.03	6.25	4.61	5.46	6.08	5.83	5.99	6.61	6.09	5.62	5.77	5.84
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,h,i)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	0.1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112912



NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005 (The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

113 samples supplied by Leighton Fulton Hogan Joint Venture on the 9th July, 2014. Job Number: D4685
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 18 MtW 69	Sample 19 MtW 70	Sample 20 MtW 71	Sample 21 MtW 72	Sample 22 MtW 73	Sample 23 MtW 74	Sample 24 MtW 75	Sample 25 MtW 76	Sample 26 MtW 77	Sample 27 MtW 78	Sample 28 MtW 79	Sample 29 MtW 80	Sample 30 MtW 81	Sample 31 MtW 82	Sample 32 MtW 83	Sample 33 MtW 84	Sample 34 MtW 85
		Job No.	D4685/18	D4685/19	D4685/20	D4685/21	D4685/22	D4685/23	D4685/24	D4685/25	D4685/26	D4685/27	D4685/28	D4685/29	D4685/30	D4685/31	D4685/32	D4685/33	D4685/34
Moisture Content (% moisture)	..	Inhouse - 110° C	23	21	23	22	21	19	21	19	18	25	18	19	21	21	19	24	23
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	21	15	20	34	11	10	16	10	10	14	11	9	7	10	12	14	9
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	17	23	22	22	23	27	26	21	37	33	25	30	21	20	25	22	31
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	13	18	17	18	14	17	24	13	16	23	18	20	14	14	18	17	20
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	9	9	14	14	15	23	20	14	34	28	21	24	16	18	17	15	19
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	3	4	5	5	6	7	8	6	8	9	8	8	6	6	7	6	8
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	35	27	33	38	40	55	48	43	76	68	53	57	36	44	47	45	52
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 4B1	0.08	0.08	0.06	0.06	0.42	0.13	0.07	0.10	0.07	0.13	0.09	0.07	0.06	0.09	0.07	0.08	0.08
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	6.06	5.37	5.95	5.92	5.81	5.57	5.11	5.94	5.56	5.56	5.58	5.35	5.69	5.35	5.59	5.56	5.28
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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	0.2	0.2	<0.1	<0.1
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.3	<0.1	0.1
Pyrene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.3	<0.1	0.1
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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	0.2	0.1	<0.1	<0.1
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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	0.2	0.1	<0.1	<0.1
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	0.7	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.2	0.1	<0.1	<0.1
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2	1.10	<0.05	0.4
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112912



NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005 (The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

113 samples supplied by Leighton Fulton Hogan Joint Venture on the 9th July, 2014. Job Number: D4685
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 35 MtW 86	Sample 36 MtW 87	Sample 37 MtW 88	Sample 38 MtW 89	Sample 39 MtW 90	Sample 40 MtW 91	Sample 41 MtW 92	Sample 42 MtW 93	Sample 43 MtW 94	Sample 44 MtW 95	Sample 45 MtW 96	Sample 46 MtW 97	Sample 47 MtW 98	Sample 48 MtW 99	Sample 49 MtW 100	Sample 50 MtW 101	Sample 51 MtW 102
		Job No.	D4685/35	D4685/36	D4685/37	D4685/38	D4685/39	D4685/40	D4685/41	D4685/42	D4685/43	D4685/44	D4685/45	D4685/46	D4685/47	D4685/48	D4685/49	D4685/50	D4685/51
Moisture Content (% moisture)	..	Inhouse - 110° C	22	15	20	20	18	22	21	20	20	19	20	21	17	21	20	27	19
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPMs	17	7	11	8	9	15	14	14	8	8	15	17	9	10	13	67	8
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPMs	29	17	28	23	25	24	21	20	21	22	24	23	22	22	21	25	24
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPMs	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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPMs	19	14	17	17	18	21	19	20	17	20	19	18	19	20	20	14	17
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPMs	17	15	17	16	14	15	14	16	13	18	18	16	22	18	14	15	19
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPMs	5	6	6	8	7	10	7	8	6	7	9	7	7	8	7	6	13
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPMs	48	184	47	37	41	43	40	42	31	39	46	43	46	44	39	40	42
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPMs	<0.1	0.5	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 4B1	0.08	0.08	0.07	0.07	0.07	0.07	0.09	0.07	0.37	0.23	0.10	0.10	0.14	0.12	0.12	0.06	0.12
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.46	6.05	5.37	5.62	5.43	5.57	6.13	5.51	6.58	5.70	5.18	5.18	5.34	5.17	5.40	5.80	5.29
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,k)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPMs
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112912



NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005
(The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

113 samples supplied by Leighton Fulton Hogan Joint Venture on the 9th July, 2014. Job Number: D4685
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 52 MtW 103	Sample 53 MtW 104	Sample 54 MtW 105	Sample 55 MtW 106	Sample 56 MtW 107	Sample 57 MtW 108	Sample 58 MtW 109	Sample 59 MtW 110	Sample 60 MtW 111	Sample 61 MtW 112	Sample 62 MtW 113	Sample 63 MtW 114	Sample 64 MtW 115	Sample 65 MtW 116	Sample 66 MtW 117	Sample 67 MtW 118	Sample 68 MtW 119
		Job No.	D4685/52	D4685/53	D4685/54	D4685/55	D4685/56	D4685/57	D4685/58	D4685/59	D4685/60	D4685/61	D4685/62	D4685/63	D4685/64	D4685/65	D4685/66	D4685/67	D4685/68
Moisture Content (% moisture)	..	Inhouse - 110° C	21	16	31	19	20	29	20	17	21	20	20	19	20	19	20	19	18
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	9	16	117	12	9	10	25	9	9	27	12	9	8	26	9	7	9
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	20	25	33	22	21	22	22	21	19	23	19	20	17	19	18	19	20
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<0.1	<0.1	0.2	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	18	21	13	17	18	17	14	15	19	15	13	16	15	18	14	16	16
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	18	13	24	18	15	15	17	18	16	15	16	16	12	14	17	7	19
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	7	5	7	6	7	7	6	7	7	6	5	6	5	6	6	3	7
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	39	52	51	40	38	39	39	41	38	38	35	35	27	34	38	16	38
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.1	<0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	<0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 4B1	0.13	0.10	0.07	0.09	0.10	0.11	0.07	0.11	0.09	0.08	0.08	0.36	0.12	0.13	0.09	0.09	0.10
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.04	5.24	5.85	5.44	5.54	5.42	5.62	5.21	5.42	5.89	5.49	5.38	5.05	5.47	5.34	5.44	5.48
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,k,l)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.2	Not Detected	0.3	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112912



NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005 (The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

113 samples supplied by Leighton Fulton Hogan Joint Venture on the 9th July, 2014. Job Number: D4685
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 69 MtW 120	Sample 70 MtW 121	Sample 71 MtW 122	Sample 72 MtW 123	Sample 73 MtW 124	Sample 74 MtW 125	Sample 75 MtW 126	Sample 76 MtW 127	Sample 77 MtW 128	Sample 78 MtW 129	Sample 79 MtW 130	Sample 80 MtW 131	Sample 81 MtW 132	Sample 82 MtW 133	Sample 83 MtW 134	Sample 84 MtW 135	Sample 85 MtW 136
		Job No.	D4685/69	D4685/70	D4685/71	D4685/72	D4685/73	D4685/74	D4685/75	D4685/76	D4685/77	D4685/78	D4685/79	D4685/80	D4685/81	D4685/82	D4685/83	D4685/84	D4685/85
Moisture Content (% moisture)	..	Inhouse - 110° C	19	19	23	23	29	29	22	22	23	43	22	21	21	22	19	20	17
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	9	8	10	15	13	13	9	9	14	13	11	10	14	13	9	10	8
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	19	19	18	21	20	19	19	19	19	21	21	19	19	20	23	23	19
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	18	15	15	15	17	16	12	11	16	15	16	15	20	18	16	16	17
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	12	14	14	18	15	13	15	18	14	15	14	14	13	12	24	19	18
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	6	6	7	8	6	5	5	6	5	6	7	6	5	4	7	8	5
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	30	37	42	44	36	35	31	41	35	36	37	34	33	29	43	50	39
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 4B1	0.11	0.09	0.08	0.13	0.15	0.20	0.79	0.89	0.64	0.47	0.62	0.37	0.12	0.40	0.08	0.06	0.09
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.34	5.44	5.35	5.44	5.43	6.27	6.13	6.04	5.61	5.85	5.64	5.68	5.04	4.83	5.21	5.99	4.99
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<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
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<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
Pyrene (mg/Kg)	..	c	<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
Benz(a)anthracene (mg/Kg)	..	c	<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
Chrysene (mg/Kg)	..	c	<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
Benzo(b,h,i)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<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
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<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
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	Not Detected	0.1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.3	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112912



NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005 (The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

113 samples supplied by Leighton Fulton Hogan Joint Venture on the 9th July, 2014. Job Number: D4685
Analysis requested by James Diamond. Your Project: C280-241
(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 86 MtW 137	Sample 87 MtW 138	Sample 88 MtW 139	Sample 89 MtW 140	Sample 90 MtW 141	Sample 91 MtW 142	Sample 92 MtW 143	Sample 93 MtW 144	Sample 94 MtW 145	Sample 95 MtW 146	Sample 96 MtW 147	Sample 97 MtW 148	Sample 98 MtW 149	Sample 99 MtW 150	Sample 100 MtW 151	Sample 101 MtW 152	Sample 102 MtW 153
		Job No.	D4685/86	D4685/87	D4685/88	D4685/89	D4685/90	D4685/91	D4685/92	D4685/93	D4685/94	D4685/95	D4685/96	D4685/97	D4685/98	D4685/99	D4685/100	D4685/101	D4685/102
Moisture Content (% moisture)	..	Inhouse - 110° C	20	20	15	26	26	27	20	19	20	20	19	20	19	23	16	18	17
METALS																			
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPLMS	9	9	8	10	7	10	11	8	7	8	11	7	10	11	6	8	8
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPLMS	23	24	26	24	22	24	18	20	16	24	83	17	30	14	19	22	27
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPLMS	<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
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPLMS	15	19	20	17	22	21	16	17	20	19	20	20	18	26	15	20	18
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPLMS	21	13	20	29	17	19	13	11	11	15	25	17	18	7	16	13	19
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPLMS	7	5	7	10	7	8	6	5	4	6	9	8	6	3	6	5	7
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPLMS	48	30	44	57	34	41	35	28	22	33	58	40	40	16	28	26	39
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPLMS	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 4B1	0.08	0.10	0.10	0.10	0.11	0.11	0.61	0.25	0.13	0.09	0.10	0.14	0.15	0.10	0.08	0.99	0.09
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.58	5.11	5.09	5.37	5.52	5.06	5.06	4.93	5.24	5.15	5.65	5.87	5.30	5.03	5.36	5.03	5.74
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene (mg/Kg)	..	c	<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
Acenaphthylene (mg/Kg)	..	c	<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
Acenaphthene (mg/Kg)	..	c	<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
Fluorene (mg/Kg)	..	c	<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
Phenanthrene (mg/Kg)	..	c	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.7	<0.1	0.3	<0.1	<0.1	<0.1	0.5
Anthracene (mg/Kg)	..	c	<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
Fluoranthene (mg/Kg)	..	c	<0.1	0.2	0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.4	1.3	<0.1	0.8	<0.1	<0.1	0.1	1.0
Pyrene (mg/Kg)	..	c	<0.1	0.2	0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.4	1.4	<0.1	0.8	<0.1	<0.1	0.1	1.0
Benz(a)anthracene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.4	<0.1	0.2	<0.1	<0.1	<0.1	0.2
Chrysene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.4	<0.1	0.2	<0.1	<0.1	<0.1	0.3
Benzo(b,k,l)fluoranthene (mg/Kg)	..	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.8	<0.2	0.4	<0.2	<0.2	<0.2	0.5
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.4	<0.1	0.2	<0.1	<0.1	<0.1	0.2
Dibenz(a,h)anthracene (mg/Kg)	..	c	<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
Benzo(g,h,i)perylene (mg/Kg)	..	c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.5	<0.1	0.3	<0.1	<0.1	<0.1	0.3
Sum of reported PAHs (mg/Kg)	11	c	Not Detected	0.5	0.3	Not Detected	Not Detected	0.5	Not Detected	Not Detected	Not Detected	1.8	6.6	Not Detected	3.5	Not Detected	Not Detected	0.3	4.3
Benzo(a)pyrene (mg/Kg)	12	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	0.5	<0.05	0.3	<0.05	<0.05	<0.05	0.3
HYDROCARBON ANALYSIS RESULTS																			
BTEX																			
Benzene (mg/Kg)	13	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene (mg/Kg)	14	c	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene (mg/Kg)	15	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-Xylene (mg/Kg)	16	c	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene (mg/Kg)	..	c	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons																			
C10-C14 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15-C28 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29-C36 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Sum of C10-C36 (mg/Kg)	17	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C10-C16 Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10-C16 less Naphthalene Fraction (mg/Kg)	..	c	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C34-C40 Fraction (mg/Kg)	..	c	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3125 ICPLMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - Envirolab Report No. 112912



NOTES

1. DIW = Dry Weight. na = no guidelines available
2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005 (The Excavation Natural Material Exemption 2012)
3. For statistical purposes, half detection limit replaced with samples NOT DETECTED
4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available

RESULTS OF SOIL ANALYSIS

113 samples supplied by Leighton Fulton Hogan Joint Venture on the 9th July, 2014. Job Number: D4685

Analysis requested by James Diamond. Your Project: C280-241

(Po Box 9090, MOONEE BEACH NSW 2450).

	S2W ENM Number	Method	Sample 103 MtW 154	Sample 104 MtW 155	Sample 105 MtW 156	Sample 106 MtW 157	Sample 107 MtW 158	Sample 108 MtW 159	Sample 109 MtW 160	Sample 110 MtW 161	Sample 111 MtW 162	Sample 112 MtW 163	Sample 113 MtW 164	MIN	MAX	AVERAGE	ENM - Col 2 AVERAGE	ENM - Col 3 MAX
		Job No.	D4685/103	D4685/104	D4685/105	D4685/106	D4685/107	D4685/108	D4685/109	D4685/110	D4685/111	D4685/112	D4685/113				see note 2	see note 2
Moisture Content (% moisture)	..	Inhouse - 110°C	17	21	21	21	19	18	21	20	20	20	18	15	43	21	..	..
METALS																		
Arsenic (mg/Kg)	4	1:3Nitric/HCl digest - APHA 3120 ICPMs	8	10	8	8	10	7	8	15	8	7	8	6	117	13	20	40
Lead (mg/Kg)	3	1:3Nitric/HCl digest - APHA 3120 ICPMs	21	29	20	27	40	23	19	26	26	20	18	14	83	23	50	100
Cadmium (mg/Kg)	2	1:3Nitric/HCl digest - APHA 3120 ICPMs	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.5	1.0
Chromium (mg/Kg)	5	1:3Nitric/HCl digest - APHA 3120 ICPMs	18	18	18	17	16	15	17	14	16	13	13	11	26	17	75	150
Copper (mg/Kg)	6	1:3Nitric/HCl digest - APHA 3120 ICPMs	15	26	13	25	25	16	13	28	15	10	11	5	34	16	100	200
Nickel (mg/Kg)	7	1:3Nitric/HCl digest - APHA 3120 ICPMs	6	8	4	7	8	7	7	7	6	4	5	3	13	6	30	60
Zinc (mg/Kg)	8	1:3Nitric/HCl digest - APHA 3120 ICPMs	31	43	24	46	48	38	37	55	40	22	28	16	184	42	150	300
Mercury (mg/Kg)	1	1:3Nitric/HCl digest - APHA 3120 ICPMs	0.1	0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.54	0.10	0.5	1.0
Soil Conductivity (1:5 water dS/m)	9	Rayment and Higginson 481	0.07	0.07	0.17	0.07	0.12	0.10	0.09	0.05	0.08	0.07	0.09	0.05	1.04	0.16	1.5	3.0
Soil pH (1:5 water)	10	Rayment and Higginson 4A1	5.52	6.03	5.06	5.57	5.58	5.55	5.51	5.41	5.85	5.07	5.59	4.61	6.61	5.54	5 - 9	4.5 - 10
Polycyclic Aromatic Hydrocarbons (PAH)																		
Naphthalene (mg/Kg)	..	C	<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	..	..	..
Acenaphthylene (mg/Kg)	..	C	<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	..	..	..
Acenaphthene (mg/Kg)	..	C	<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	..	..	..
Fluorene (mg/Kg)	..	C	<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	..	..	..
Phenanthrene (mg/Kg)	..	C	<0.1	<0.1	0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	..	..	..
Anthracene (mg/Kg)	..	C	<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	..	..	..
Fluoranthene (mg/Kg)	..	C	0.2	<0.1	0.3	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	..	..	..
Pyrene (mg/Kg)	..	C	0.2	<0.1	0.3	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.4	..	..	..
Benz(a)anthracene (mg/Kg)	..	C	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	..	..	..
Chrysene (mg/Kg)	..	C	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	..	..	..
Benzo(b,k,l)fluoranthene (mg/Kg)	..	C	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	..	..	..
Indeno(1,2,3-c,d)pyrene (mg/Kg)	..	C	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	..	..	..
Dibenz(a,h)anthracene (mg/Kg)	..	C	<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	..	..	..
Benzo(g,h,i)perylene (mg/Kg)	..	C	<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	..	..	..
Sum of reported PAHs (mg/Kg)	11	C	0.4	Not Detected	0.7	Not Detected	Not Detected	1.1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	6.6	<1.0	20	40
Benzo(a)pyrene (mg/Kg)	12	C	0.1	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.1	<0.5	0.5	1.0
HYDROCARBON ANALYSIS RESULTS																		
BTEX																		
Benzene (mg/Kg)	13	C	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	..	..	0.5
Toluene (mg/Kg)	14	C	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	..	..	65
Ethylbenzene (mg/Kg)	15	C	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	..	..	25
m+p-Xylene (mg/Kg)	16	C	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	..	..	15
o-Xylene (mg/Kg)	..	C	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	..	..	..
Naphthalene (mg/Kg)	..	C	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	..	..	..
Total Recoverable Hydrocarbons																		
C10-C14 Fraction (mg/Kg)	..	C	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..	..
C15-C28 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
C29-C36 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
Sum of C10-C36 (mg/Kg)	17	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<250	250	500
C10-C16 Fraction (mg/Kg)	..	C	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..	..
C10-C16 less Naphthalene Fraction (mg/Kg)	..	C	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..	..
C16-C34 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
C34-C40 Fraction (mg/Kg)	..	C	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..	..
Contaminants (Physical - rubber, plastic, bitumen, paper, cloth, paint wood) (%)	18	** As per RTA T276	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1

METHODS REFERENCE

a. ¹³Nitric/HCl digest - APHA 3125 ICPMsb. ¹³Nitric/HCl digest - APHA 3120 ICPOES

c. Analysis sub-contracted - Envirolab Report No. 112912



NOTES

1. DW = Dry Weight. na = no guidelines available

2. ENM Guidelines - Protection of the Environment Operations (Waste) Regulation 2005

(The Excavation Natural Material Exemption 2012)

3. For statistical purposes, half detection limit replaced with samples NOT DETECTED

4. ** denotes these test procedures are as yet not NATA accredited but quality control data is available