ATTACHMENT 3 – CONTAMINATION ASSESSMENT

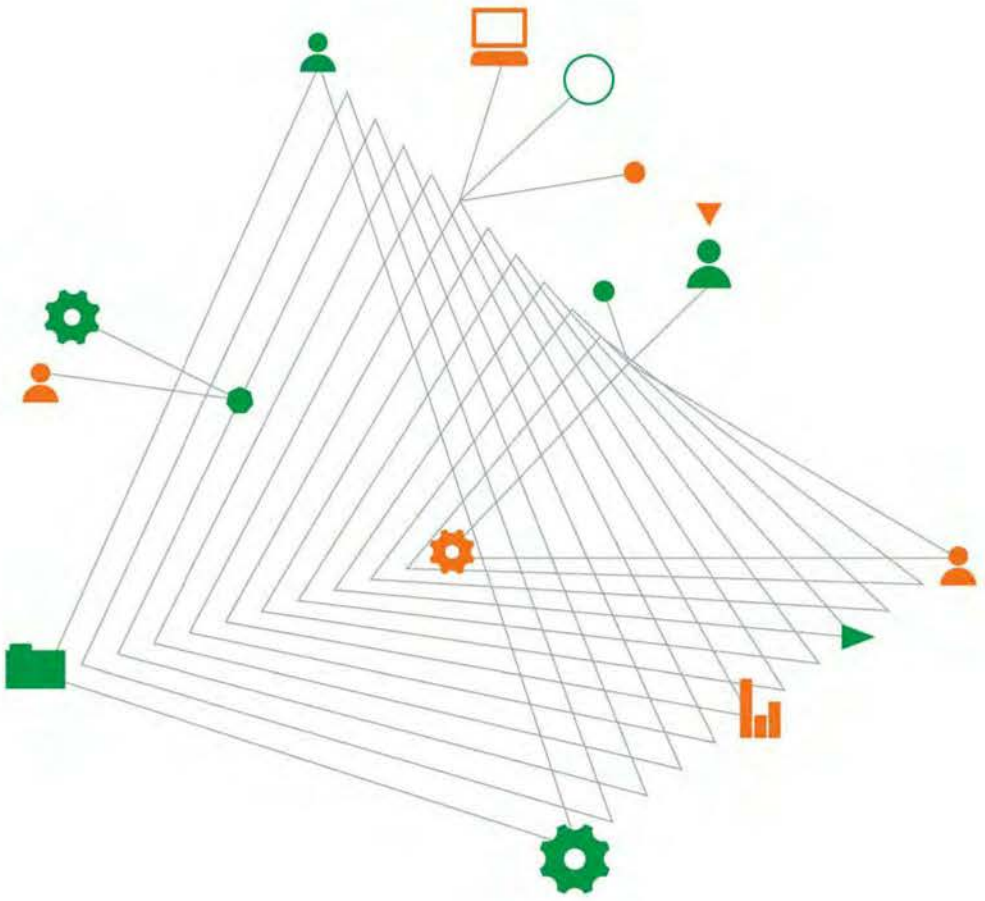
coffey
A TETRA TECH COMPANY

Dexus Property Group Pty Ltd

North Shore Private Hospital, Stage 1 - East Tower

Detailed Site Investigation

14 April 2016



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North Shore Private Hospital, Stage 1 - East Tower

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For and on behalf of Coffey

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Abbreviations

µg/L	micrograms per litre
ACM	Asbestos Containing Materials
AEC	Area of Environmental Concern
AF	Asbestos Fines
AH	Auger Hole
ANZECC	Australian and New Zealand Environment and Conservation Council
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999
bgs	below ground surface
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
C6-C36	Hydrocarbon chainlength fraction
CEMP	Construction Environmental Management Plan
COPC	Chemical of potential concern
DA	Development Application
DBYD	Dial Before You Dig
DoH	Dept. of Health, Western Australia
DP	Deposited Plan
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EIL	Ecological Investigation Level
ENM	Excavated Natural Material
ESL	Ecological Screening Level
FA	Fibrous Asbestos
GIL	Groundwater Investigation Level
GPR	Ground Penetrating Radar
Ha	Hectare
HIL	Health Investigation Level
HSL	Health Screening Level
IP	Interface Probe
LOR	Limit of Reporting
mg/kg	milligrams per kilogram
mg/L	milligrams per litre

NAPL	Non-aqueous Phase Liquid
NATA	National Association of Testing Authorities
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
OCP	Organochlorine Pesticide
OPP	Organophosphorous Pesticide
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PID	Photoionisation Detector
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
RL	Relative Level
RPD	Relative Percent Difference
SEPP55	State Environmental Planning Policy No. 55 – Remediation of Land
SOP	Standard Operating Procedures
TPH	Total Petroleum Hydrocarbon
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Level
UST	Underground Storage Tank
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compound

1. Introduction

1.1. General

Coffey Geotechnics Pty Ltd (Coffey) was engaged by Dexus Property Group (Dexus) to prepare a Detailed Site Investigation (DSI) report to support a Development Application (DA) for the proposed Stage 1 development of a property known as 12 Frederick Street, St Leonards (the property). Figure 1 illustrates the location of the site.

The Stage 1 development comprises a multi-level medical facility known as East Tower, which will form part of the North Shore Private Hospital. East Tower will be located at the southern end of the site, occupying an area of land at the north east corner of Reserve Road and Westbourne Street (the Stage 1 site). Figure 2 illustrates the extent of the Stage 1 site.

The work was commissioned by Donald Cant Watts Cork on behalf of Dexus. The works were undertaken in accordance with our fee proposal submitted by Coffey dated 7 March 2016 (ref: GEOTLCOV25513AA-AD).

1.2. Proposed Development

The site historically formed part of a shale quarry that operated from about 1880 to the late 1960s. The proposed development will be constructed in two separate stages. The Stage 1 development extends over an exposed face of the former quarry walls, as illustrated below:

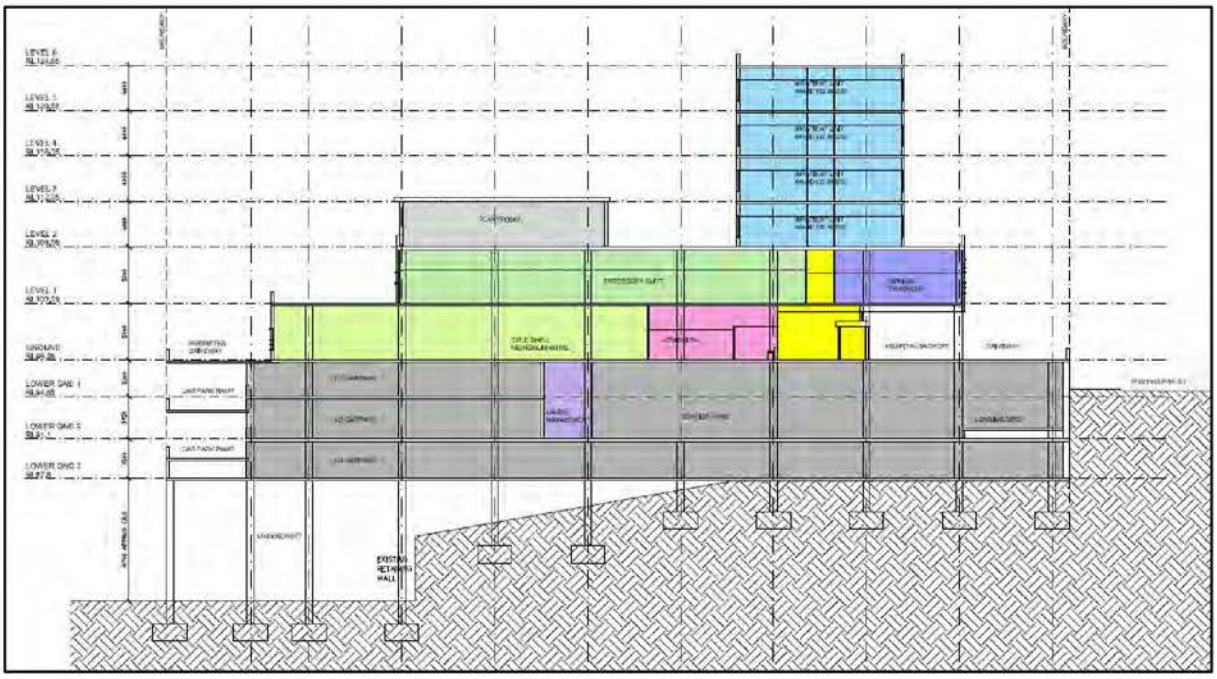

Figure 1.1: Illustration of the proposed Stage 1 Development

The Stage 1 new development will consist of a five to six level medical facility, with ground floor level at about RL 98m (near current street level at the intersection of Reserve Road and Westbourne Street at the south corner of the site). Below this will be a three level basement for car parking and storage.

The current design documents show the lowest of the three basement levels will be cut into the face of the former quarry to a depth of about RL 87 m, and be supported by columns above the old quarry base (approx. RL 77 m) to create an undercroft.

Coffey understands that the Stage 2 development will comprise a modern commercial development across the remainder of the St Leonards Business Centre site.

1.3. Objectives

In general, the DSI has been prepared to characterise ground conditions at the site and assess the suitability of the site in accordance with the requirements set out under State Environmental Planning Policy No. 55 *Remediation of Land* (SEPP55).

The specific objectives of the DSI were to:

- Assess the potential for contamination of the site resulting from current and historical land uses;
- Investigate potential surface and subsurface contamination underlying the site in the context of assessing the suitability of the site for the proposed redevelopment; and
- Assess what remediation works may be required to make the site suitable for future land uses.

1.4. Scope of Work

To meet the above objectives, Coffey undertook the following works:

- Review of previous reports prepared for the site to identify historical land uses and the environmental context of the site.
- Undertake a site walkover survey to observe site conditions and develop a sampling programme to meet the objectives outlined above.
- Undertake intrusive ground investigation works to assess the significance of potential contamination suspected within potential sources of contamination identified.
- Preparation of this DSI report generally in accordance with relevant sections of NSW EPA 'Guidelines for Consultants Reporting on Contaminated Sites' NSW OEH (2011).

1.5. Applicable Regulations & Guidelines

This assessment has been prepared having regard to the following regulations and guidance documentation:

- State Environmental Planning Policy No 55 - Remediation of Land
- DUAP/EPA (1998); Managing Land Contamination: Planning Guidelines
- NEPC (1999) National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM) (No. 1) as registered and amended in 2013, and associated Schedule B guidelines.
- DEC (2006); Guidelines for the NSW Site Auditor Scheme, 2nd edition
- NSW OEH (2011); Guidelines for Consultants Reporting on Contaminated Sites
- DEC (2007); Guidelines for the Assessment and Management of Groundwater Contamination
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality, published by ANZECC and Agriculture and Resource Management Council of Australia and New Zealand.

2. Site Setting

2.1. Site Identification

Site identification details are summarised in Table 2.1. The location and layout of the Stage 1 site is shown in Figures 1 and 2, respectively.

Table 2.1: Site Identification

Site Address:	12 Frederick Street, St. Leonards, NSW
Stage 1 Site Area:	Approximately 0.6ha
Site Identification:	Part Lot 1 in Deposited Plan (DP) 591747
Current Zoning:	IN1 – General Industrial in Willoughby Local Environmental Plan 2012
Current Land Use:	Light industrial/commercial

2.2. Site Description

A site walkover was undertaken by a suitably experienced Coffey environmental engineer on 9th March 2016.

The Stage 1 site falls within the St Leonards Business Centre, which is located within the south western part of the former quarry. The Stage 1 site is situated at two distinct levels between a vacant, steeply sloping and mostly vegetated quarry face.

The southern-most part of the site is situated at the crest of the former quarry (approx. RL 98m) and is accessed via locked gates along Reserve Road boundary. This part of the Stage 1 is vacant with the exception of a small brick structure and concrete pad adjacent to the Westbourne Street boundary. The use of this brick structure is not known. The adjoining concrete pad appears consistent with petroleum storage infrastructure, comprising a small underground storage tank (UST), hand pump and vent pipe. No UST dip/fill points were noted.

Photo 1: indicative location of brick structure and underground petroleum storage infrastructure.

Photo 2: concrete slab with hand pump and vent pipe.

Ground surface across the southern part of the Stage 1 site is a mixture of concrete surfacing associated with the former helipad, and exposed soil. A number of mature trees are present along the Westbourne Street boundary, and ruderal vegetation is present along the crest and slope of the former quarry face.

The northern portion of the Stage 1 site is situated within the base of the former quarry (approx. RL77m) and accessed via concrete paved road which links to Frederick Street to the north. This part of the Stage 1 site is occupied by a commercial warehouse that was tenanted by Australia Post. The

warehouses were concrete floored with shelving used to store various goods temporarily. No significant cracking or excessive staining was noted on accessible parts of the warehouse floor. The rooftop of this structure was used as car parking for the adjoining commercial building. Areas surrounding the warehouse are completely surfaced with concrete hardstand.

2.3. Surrounding Land Uses

Land uses surrounding the site are summarised within Table 2.2.

Table 2.2: Land uses surrounding the Stage 1 site

Direction	Land Uses
North	St Leonards Business Centre, which comprises 13 individual commercial office/warehouse units. Commercial land uses extend further beyond Frederick Street until the M2 Freeway approximately 450 meters north of the site. A tunnel believed to connect to an adjacent former shale quarry was located to the north along the western boundary of the quarry. The tunnel has been backfilled with fill material (building rubble) from an unknown location.
East	Various commercial/light industrial properties are located to the east of the site. The T1 Northern railway is located approximately 300m east of the site, beyond which lies various high density residential apartment blocks and recreational areas.
South	Royal North Shore Public Hospital and Gore Hill Memorial Cemetery and Park. Low density residential properties are located south of Gore Hill Park.
West	North Shore Private Hospital is located directly west of the site. Various commercial buildings are located further west of the site beyond which lies the Pacific Highway. Multiple high/low density residential structures are located west of Pacific Highway.

2.4. Local Geological Setting

The site locality is situated over landforms associated with the Ashfield Shale of the Wianamatta Group (typically black to dark grey shale and laminite), close to the geological interface with the underlying Hawkesbury Sandstone (typically medium to coarse grained, quartzose sandstone). At this separation is the variable Mittagong Formation, several metres thick comprising interbedded shale, laminite and medium-grained quartzose sandstone.

The locality was a former low shale ridge that was subject to quarrying for brick-making, with the floor of the former quarry likely extending to the underlying Mittagong Formation or Hawkesbury Sandstone.

Former quarry walls are exposure to a depth of about 18 m below street level to the north of the Stage 1 site. These exposures indicate weathered Ashfield Shale bedrock, appearing to grade from residual soil at road level, to slightly weathered to fresh bedrock at the base of the excavation. The weathering due to exposure may disguise the true rock condition behind the faces.

Fill material was expected at base and crest of the quarry. Based on site setting, it is assessed that the site is not located within an area affected by acid sulphate soils.

2.5. Hydrogeology and Hydrology

No creeks or rivers surround or dissect the site. The closest surface water body is Gore Creek, a tributary of the Lane Cove River located approximately 650m south west of the site.

Given the setting of the site is a low shale ridge, it is anticipated that groundwater exists within the shale / sandstone bedrock below the base of the former quarry. Groundwater seepages may occur within shallower soil horizons within the southern portion of the site although these are likely to discontinuous lenses associated with infiltration rather than indicative of the underlying water table.

Given the sites geographic location, groundwater is expected to flow south-west towards the Lane Cove River and its tributaries.

A search of groundwater bore licences for the area identified three registered groundwater bores within a 500m radius of the site. The details of these bores are summarised in Table 2.3.

Table 2.3: Licensed groundwater bores within 500m of the Site

Bore ID	Installation Date	Use	Active?	Depth (m)	Location
GW072478	10/01/1995	Domestic	Unknown	180.5	North Shore Hospital approx. 200m south
GW103591	11/01/2001	Monitoring bore	Yes	5.80	Reil Dealership 24 Herbert St Artarmon 2064 NSW
GW103841	11/01/2001	Monitoring bore	Yes	5.80	Reil Dealership 24 Herbert St Artarmon 2064 NSW

2.6. Site History

Coffey were engaged by Dexus to prepare a review of historic land uses as part of the following assessment:

- Coffey (Oct 2015); *Phase 1 Preliminary Site Investigation; 12 Frederick Street, St. Leonards* (Ref: GEOTLCOV25513AA; dated 9th October 2015)

The review of available records indicates:

- The site operated as a shale quarry operated by North Sydney Brick & Tile Co. It is understood that quarrying activities commenced in 1880 and ceased in circa1960. Site observations indicate that the quarry was not backfilled, but rather regraded to create two levels to facilitate development.
- Aerial photographs of the area indicate that site formed the south western corner of the quarry, with quarrying worked extending to the north and east of the Stage 1 site. The main processing plant for the brick and tile works were located off site, to the east/northeast of the site.
- The redevelopment of the site commenced in circa 1960 where a small warehouse was established on northern portion of the site, adjacent to Reserve Road. The southern portion of the site remained underdeveloped since this time.
- The commercial/warehouse operations were expanded on site during the 1970's with the St Leonards Business Centre established on site in 1974.
- Two licenses to store Dangerous Goods were identified on site. Mockridge Bulmer was licensed to store approx. 1,400L liquid hydrocarbons associated with a printing facility situated within Unit 2 of the St Leonards Business Centre. Noyes Bros. Pty Ltd was licensed to store 5,000L of petroleum hydrocarbons within a roofed store. Both operations are understood to have operated in units to the north of the Stage 1 site.

- A search of the public records held by the NSW Environment Protection Authority did not identify the site or land immediately surrounding the site as contaminated land.

3. Preliminary Conceptual Site Model

3.1. Areas of Environmental Concern

The *Phase 1 Preliminary Site Investigation* report (Coffey, Oct 2015) identified a number of potential Areas of Environmental Concern (AECs), as outlined in Table 3.1.

Table 3.1: Summary of AECs

Potential Contaminating Activity / AEC	Contaminants of Potential Concern (COPC)	Likelihood of Impact	Comments
Former Quarry & Tile/Brick Works on site	Metals (e.g. arsenic, cadmium, chromium (III and VI), lead mercury, nickel, zinc), and PAH	Low-Moderate	The site historically formed part of a larger shale quarry, with the brick/tile manufacturing works located off site to the east. There is potential for the transition earth metals within source materials, and PAH derived from kilns (i.e. derived from either coal/coke fuel source, or ash) may have been deposited in base of the quarry. Refractory bricks used within brick kilns may have also contained hexavalent chromium. (Source: *Industry Profile: Ceramics, Cement & Asphalt Manufacturing Works*, DOE UK, 1996)
Storage and use of hydrocarbons (on-site & off site)	TRH, BTEX, PAHs, heavy metals (lead)	Moderate	A small suspected UST, hand-operated pump and vent pipe were identified on site. The type(s) of fuels stored in this UST are not known. Two separate licences to store dangerous goods were identified in units to the north of the site. It is unknown whether these tanks are still present onsite.
Fill materials of unknown quality and origin	Heavy metals, PAH, TRH, BTEX, OCP, PCB and asbestos.	Low-Moderate	Observations made on site indicate that the quarry was not backfilled however some minor filling may have occurred to facilitate site development. Fill materials may have derived from spoil and other wastes from the quarry, or comprised fill materials imported from other sites. A tunnel cut into the western face of the former quarry is situated to the north of the site. was been backfilled with soil in c.2001. The origin of these soils is unknown and appears to include building aggregates
Former Printing Workshop	Acids, Alkalis, Solvents, Heavy metals	Low-Moderate	A former printing workshop operated to the north of the site. No breaches of the Environmental Protection License were noted.

Notes:
TRH: total recoverable hydrocarbon
BTEX: benzene, toluene, ethylbenzene, xylene
PAH: polycyclic aromatic hydrocarbon
OCP: Organochlorine Pesticides
PCB: polychlorinated biphenyls
Heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc.
Solvents are typically mobile, volatile organic compounds with moderate to high vapour pressure.

3.2. Exposure Pathways

The key environmental pathways and exposure routes by which potentially contaminative substances within AEC can reach environmental and human health receptors are assessed to comprise:

- Ingestion of site soils
- Dermal contact with soil in areas of soft landscaping
- Inhalation of vapours, dusts and fibres
- Leaching from unsaturated soils to groundwater
- Vertical and lateral contaminant migration through the saturated zone
- Contaminant migration along preferential flow pathways (e.g. existing service corridors, building foundations, backfilled tunnels etc.)
- Surface runoff
- Abstraction of groundwater for domestic uses

3.3. Receptors

The following receptors were identified:

- Current and future commercial workers using the site
- Construction workers undertaking subsurface maintenance works
- Site visitors attending the medical facility, including children and the elderly
- Groundwater
- Abstraction bore located within Royal North Shore Hospital
- Surface water - Gore Creek and Lane Cover River

3.4. Preliminary Conceptual Site Model

Table 3.2 presents the preliminary conceptual site model

Table 3.2: Preliminary conceptual site model

Potential Contaminating Activity/ Area of Environmental Concern	Contaminants of Potential Concern	Likelihood of Impact	Potential Exposure Pathways	Receptors	Comments
Former Quarry & Tile/Brick Works	Metals (e.g. arsenic, cadmium, chromium (III and VI), lead mercury, nickel, zinc), and PAH	Low-Moderate	• Inhalation of dusts • Ingestion of dusts Dermal contact	• Current/Future Commercial Workers • Site Visitors • Ground workers (future maintenance event)	Extensive hard surfacing will restrict current and future site workers being exposed to fill below buildings, although workers involved in site redevelopment and/or future subsurface maintenance will be exposed to fill.
			• Leaching from unsaturated soils • Groundwater migration • Contaminant migration along preferential flow pathways	• Groundwater • Groundwater abstraction bore off site • Surface water off site	Existing hard surfacing and associated site drainage is anticipated to restrict infiltration. The COPC identified from the former quarry and brick/tile manufacturing facility are not readily soluble and strongly adsorbed to soils. For these reasons, soils impacted by the former quarry and brick/tile manufacturing facility are unlikely to significantly impact groundwater and surface water receptors.
Storage and use of hydrocarbons (on site/offsite)	TRH, BTEX, PAHs, heavy metals (lead)	Moderate	• Inhalation of dusts, vapours and fibres • Ingestion of dusts • Dermal contact • Leaching from unsaturated soils • Groundwater migration • Contaminant migration along preferential flow pathways	• Current/Future Commercial Workers • Site Visitors • Ground workers (future maintenance event) • Groundwater • Groundwater abstraction bore off site • Surface water off site	A small suspected UST and associated pump/vent pipe were identified on site. Spillages and leakages have the potential to infiltrate the underlying soil. Fuel contaminated soils has the potential to pose risks to future construction workers via dermal contact, ingestion and inhalation pathways, and future site occupants via the vapour inhalation pathway. Extensive hard surfacing will restrict current and future site workers being exposed to hydrocarbon impacts below buildings, although workers involved in site redevelopment and/or future subsurface maintenance will be exposed to impacts if present. Existing hard surfacing and associated site drainage is anticipated to restrict infiltration. Certain COPC within fill may be soluble which in turn could affect underlying groundwater

Potential Contaminating Activity/ Area of Environmental Concern	Contaminants of Potential Concern	Likelihood of Impact	Potential Exposure Pathways	Receptors	Comments
					quality, although it is anticipated that the distance between site and surface water and abstraction points off site will mitigate the potential risks to these receptors.
Fill materials of unknown quality and origin	Heavy metals, PAH, TRH, BTEX, OCP, PCB and asbestos.	Low-Moderate	• Inhalation of dusts, vapours and fibres • Ingestion of dusts Dermal contact	• Current/Future Commercial Workers • Site Visitors • Ground workers (future maintenance event)	As noted above, existing hard surfaces across the site will restrict current and future site workers from being exposed to fill below buildings. Volatile COPC within fill, where present, may pose potential risks to site workers via inhalation pathway, although given the site was developed in c.1974, it is anticipated that some degradation of these COPC has occurred. Workers involved in site redevelopment and/or future subsurface maintenance will be exposed to fill.
			• Leaching from unsaturated soils • Groundwater migration • Contaminant migration along preferential flow pathways	• Groundwater • Groundwater abstraction bore off site • Surface water off site	Existing hard surfacing and associated site drainage is anticipated to restrict infiltration. Certain COPC within fill may be soluble which in turn could affect underlying groundwater quality, although it is anticipated that the distance between site and surface water and abstraction points off site will mitigate the potential risks to these receptors.

Potential Contaminating Activity/ Area of Environmental Concern	Contaminants of Potential Concern	Likelihood of Impact	Potential Exposure Pathways	Receptors	Comments
Former Printing workshop (Offsite)	Acids, Alkalis, Solvents, Heavy metals	Low-Moderate	• Inhalation of dusts, vapours and fibres • Ingestion of dusts • Dermal contact • Leaching from unsaturated soils • Groundwater migration • Contaminant migration along preferential flow pathways	• Current/Future Commercial Workers • Site Visitors • Ground workers (future maintenance event) • Groundwater • Groundwater abstraction bore off site • Surface water off site	Accidental releases/spillages from process fluids and waste storage areas from within the former printing workshop have the potential to affect soil and groundwater conditions locally in areas to the north of the Stage 1 site, although it is anticipated that existing hard surfaces in the workshop would reduce the significance of impacts from accidental releases.

3.5. Data Gaps and Uncertainties

Based on a review of available data, data gaps and uncertainties are considered to include the following:

- Insufficient data to assess the quality of fill material and underlying natural soils across the site as a result of historic quarrying activities and subsequent development of the St Leonards Business Centre.
- Insufficient data to assess the quality of fill material and underlying natural soils as a result of historic fuel storage on site, and off-site.
- Insufficient data to assess groundwater quality.
- The variability of the COPC within the fill material.
- Quality of soils exposed along the face of the former quarry.
- Waste classification of the surplus fill and natural materials excavated as part of the proposed development.

4. Project Data Quality Objectives

4.1. Data Quality Objectives

As stated in Section 5 of Schedule B2 – Guideline on Site Characterisation in the *National Environment Protection (Assessment of Site Contamination) Measure* (the ASC NEPM) (NEPC 1999, amended 2013), the data quality objectives (DQO) process is used to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of a site.

The seven-step DQO process adopted for this assessment is provided below:

Step 1: State the Problem

The Preliminary Site Investigation (Coffey, Oct 2015) has identified a number of AECs that has the potential to have resulted in contamination of the subsurface. The primary objectives of this assessment are to:

- assess the nature, extent and significance of potential risks associated with the potential sources of contamination present within the Stage 1 site;
- provide an opinion on whether the site is suitable for the proposed residential development from a contamination perspective, in accordance with SEPP 55; and

Based on this, the main problems are:

- How many sampling locations should be established on site, and where?
- Are there access restrictions present that may affect the location of sampling locations, and the method(s) used for excavation and drilling?
- To what depths should the sampling locations be extended to?
- At what depth should soil samples be collected?
- What are the contaminants of potential concern?

Step 2: Identify the Decision

Is the site suitable for the proposed redevelopment from a contamination perspective?

Step 3: Identify Inputs to the Decision

The primary inputs to assessing the above include:

- Information presented in the Preliminary Site Investigation (Coffey, Oct 2015).
- Observations and soil headspace screening measurements made by Coffey during field investigations.
- Results of current investigations undertaken on-site.
- Relevant legislation and regulatory guidelines.

Step 4: Define the Study Boundaries

The study boundaries are defined by the boundaries of the site as shown in Figure 2. This represents the area within Stage 1 development site.

The vertical boundary is defined by the depth to bedrock beneath the site, although this boundary may require adjustment where contamination is observed to extend significantly into the underlying bedrock.

The following constraints within the study boundaries presented limitations on the sampling strategy developed for the Stage 1 site:

- Access restrictions associated with on-site buildings.
- Steep slope and dense vegetation preventing access to conduct sampling on the exposed quarry face.
- Location of underground services.

Step 5: Develop a Decision Rule

The decision rule to assess the suitability of the site will be as follows:

- Quality Assurance / Quality Control (QA/QC) assessment indicates that the data is usable; and
- Where contaminant concentrations are reported below the adopted health and environmental assessment criteria, or
- No plausible exposure mechanisms where human or environmental receptors may be exposed to potentially contaminated media in the context of the current and proposed future use of the site.

Step 6: Specify Limits of Decision Errors

The acceptable limits on decision errors to be applied in this investigation and the manner of addressing possible decision errors have been developed based on the Data Quality Indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness, which are presented in the Data Validation Report in Appendix A. The acceptable limits on decision errors are as follows:

- The acceptable limit on decision errors is a 5% probability of providing a false negative statement (i.e. assessing that the average concentrations of COPC are less than the assessment criteria when they are actually greater than the assessment criteria). Where data sets are sufficiently populated the 95% UCL of the arithmetic mean will be used to calculate this probability and the 95% UCLs are to be less than the assessment criteria. In applying statistical analysis of a data set:
  - No individual sample result should have a concentration that exceeds 250% of the adopted site assessment criteria;
  - The standard deviation of a sample population should not exceed 50% of the adopted site assessment criteria.
- Asbestos – the following approach was adopted with regard to the assessment of asbestos in soil:
  - Visual observation of presence of asbestos in the form of Asbestos Containing Material (ACM) in surface soils during the site walkover, and subsequent intrusive investigations will be undertaken.
  - Should ACM be observed then site specific factors will be considered and an approach for further investigation will be assessed. This could include adoption of amended ASC NEPM and WA Department of Health (DoH) (2009) methodology for calculation of percentage of asbestos.
  - Should evidence of AF and/or FA be observed then criteria (and methodology) in the amended ASC NEPM and WA DoH (2009) will be adopted.

The adopted site assessment criteria are nominated in Section 5 of this report.

Step 7: Optimise the Design for Obtaining Data

Based on the previous Steps 1 to 6 of the DQO process, the optimal design for obtaining the required data is presented in the following sections (i.e. proposed field and laboratory programs).

4.2. Scope of Investigation Works

Site investigation works were undertaken by Coffey between 15 and 18 March 2016, and the 29th March 2015. Groundwater sampling was carried out on the 1st April 2016. The investigation locations are shown in Figure 2.

In summary, field works comprised:

- Location and clearance of underground services, and set out of proposed sampling locations at cleared locations;
- Drilling of 8 boreholes (i.e. BH1 to BH8) to depths ranging between 6.0m (BH6, BH7 and BH8) and 25.4m (BH1) below ground surface (mbgs). BH1 was drilled from helipad level (i.e. RL 97.5m) to a relative depth of RL 72.1m. The remaining boreholes were extended to relative depths between RL 88.4m (BH4) and RL 68.1m (BH5).
- Drilling of three hand augered boreholes (i.e. AH01 to AH03) completed to depths between 0.4m and 0.55mbgs.
- Groundwater monitoring wells were installed in BH02 and BH03. Well development, purging and sampling of the two monitoring wells installed within the site.
- Soil samples collected from all boreholes were submitted for chemical analysis, with the exception of BH4.
- Chemical analysis of 23 primary soil samples from 11 sampling locations and two groundwater samples for a range of COPC.
- Implementation of a QA/QC program including chemical analysis of two blind intra-lab duplicate soil samples, one inter-laboratory duplicate, one equipment rinsate blank sample, two trip blank samples and two trip spike samples.

4.3. Sampling and Analysis Plan

4.3.1. Rationale for Sampling Pattern and Density – Former Helipad (southern part of site)

Based on our review of available information, the southern-most portion of the site comprised the former the crest of the quarry, prior to being used as a helipad associated with the adjoining hospital. The main sources of contamination identified in this portion of the site include:

- Fill of unknown origin or quality which may have resulted in a randomly distributed contamination throughout the shallow soil profile.
- Former UST, hand pump and vent.

In light of the above, sampling locations were positioned on a broadly systematic sampling pattern across the site. Three soil boreholes (BH6, BH7 and BH8) were also positioned targeting the former UST and associated infrastructure.

The southern portion of the site covers an approximate area of 1,300m^2. Table A of the Sampling Design Guidelines (NSW EPA, 1995) recommends a minimum of 7 sampling positions for a 2,000m^2 site, and hence exceeds the sampling density recommended by the NSW EPA.

4.3.2. Rationale for Sampling Pattern and Density – Base of Former Quarry (northern part of site)

The main sources of contamination within the base of the former quarry (northern part of Stage 1 site) comprise:

- Former quarry operations – fill derived from quarry workings, and tile/brick works to the east of the site.
- Storage and use of fuel and hydrocarbons off site to the north.
- Former printing workshop located to the north of the site.

Existing buildings present within the base of the former quarry restricted investigation works, with three sampling positions (BH2, BH3 and BH5) located within this area of the site. The resulting sampling density is lower than that recommended within the Sampling Design Guidelines (NSW EPA, 1995) for an investigation area of this size.

It was noted that BH2 and BH3 were positioned slightly to the north of the Stage 1 boundary to minimise disruptions to tenant operations. However, given that these boreholes were situated between the historic fuel storage area/printing workshop and the Stage 1, and were both converted to groundwater monitoring wells, it is assessed that data from these sampling locations will provide an indication of groundwater quality impacts associated with these historic off site sources.

4.3.3. Investigation and Soil Sampling Methodology

In general, the investigation and soil sampling methodology is outlined in Table 4.1.

Table 6.2: Summary of Investigation and Soil Sampling Methodology

Activity	Detail / Comments
Below Ground Service Clearance	A DBYD Underground Services Check was carried out prior to commencement of works. Investigation locations were also scanned by an underground service clearance sub-contractor to check for the presence of below ground services. Drilling locations were set up in areas cleared for below ground services. Ground Penetrating Radar (GPR) was also used to assess the extent of the UST located within the former helipad.
Borehole Drilling	Where present, hard surfaces were cored using a large diameter circular cutting bit and removed. Once the surface layer was removed, hand auguring was used initially to progress each borehole to a suitable depth to avoid the potential for undetected below ground services. Boreholes were drilled using a drilling rig equipped with continuous flight augers and triple barrel (NMLC) coring capabilities. Where practicable (dependent upon the depth and characteristics of the fill materials), driven split tube sampling was employed to collect relatively undisturbed soils samples for chemical analysis and to observe soil stratigraphy. Where sampling from driven split tube was not possible samples were collected from the hand auger or auger drill bit. Each borehole was subsequently progressed to a depth where the auger drill bit refused on bedrock. Each borehole was subsequently progressed using coring techniques. Drilling locations were recorded using a hand held GPS unit by the Coffey engineer supervising the drilling works.

Hand Augering	Three hand augered boreholes were established to improve the assessment of fill within the former helipad. Where present, the grass covering at each borehole location was removed and set aside prior the commencement of drilling. Disturbed soil samples were collected directly from the hand auger. Following completion, each hand auger borehole was backfilled with remaining soil material, and the loose grass covering was re-instated.
Soil Logging	Soil logging was undertaken by suitably qualified and experienced Coffey engineer/scientists in accordance with Coffey's Standard Operating Practices (SOP), which is consistent with AS1726 (1993) Geotechnical Site Investigations, and AS4482 (2005) Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil.
Soil Sampling	All drilling works were directed by the engineer supervising the works. All borehole logging, field screening sampling works were carried out by the Coffey engineer/scientist. In general, soil samples were collected to target different horizons within fill materials and then at approximately each one metre intervals thereafter or at changes in soil horizon or where indications of potential contamination were noted. Soil samples collected from the hand auger, split tube or auger bit were placed as quickly as practicable into sample jars provided by the laboratory. Sample jars were filled to the top to reduce headspace. Visual, olfactory, and field screening data were recorded (refer Borehole Logs; Appendix B).
Soil Splitting	Duplicate samples were collected by dividing soils collected from the hand auger and placed into two laboratory jars. Blind duplicate samples were denoted 'DUP' (e.g. DUP1). Inter laboratory duplicate samples were labelled with the suffix 'A' (e.g. DUP01A)
Soil Screening	Field headspace screening using a Photoionisation Detector (PID) with a 10.6eV lamp was undertaken where practicable to assess the potential presence of VOC to guide scheduling of chemical testing. Soil headspace screening was undertaken on soils at discrete depths at each borehole location by placing a small quantity of soil inside a zip-locked plastic bag and sealed. The sample was agitated and then the plastic bag was pierced using the tip of the PID. The readings on the PID were observed and the maximum reading recorded on the field log sheet. The PID readings are presented in each borehole log. PID calibration records are provided within Appendix C.
Sample Handling and Transportation	Sample collection, storage and transport were conducted in general accordance with the relevant Coffey SOP. Soil samples were immediately placed into laboratory supplied glass jars, with Teflon lined seals to limit possible volatile loss and placed into an ice chilled cooler. The samples were dispatched to the laboratories under chain of custody control.
Decontamination of sampling equipment	Non-disposable sampling equipment was decontaminated by scrubbing with Decon 90 solution and rinsed with potable water between samples. Rinsate blank samples were collected by pouring laboratory distilled water over non-disposable sampling equipment following decontamination to assess the efficiency of field decontamination procedures and assess the potential for cross contamination to occur between sampling positions. One rinsate blank sample was collected off the solid auger during the soil sampling programme following decontamination.
Reinstatement & disposal of soil cuttings	In general, boreholes were backfilled with drill cuttings and the top 200mm was plugged with concrete.

4.3.4. Groundwater Sampling Methodology

The methodology to install, develop and sample groundwater monitoring wells on the site is outlined in Table 4.2.

Table 4.2: Groundwater Well Installation, Development and Sampling Methods

Activity	Detail / Comments
Well Installation	Two boreholes, BH2 and BH3, were converted to groundwater monitoring wells. Each well was constructed with lengths of 50mm diameter screw threaded casing. A length of machine slotted casing was positioned to intercept groundwater, with lengths of solid casing extended to the surface. The well annulus was backfilled with fine gravel to the top of the screened interval. A 0.3m thick bentonite seal placed over the gravel pack. The remaining well void was backfilled with selected cuttings from the drilling. Bolted steel flush-fitting covers were used to complete each well at surface. Logs are included in Appendix B.
Well development	Well development was undertaken shortly after well installation. Each well was developed using a disposable bailer.
Groundwater Level & NAPL Measurements	Groundwater levels and the presence of Non Aqueous Phase Liquids (NAPL) were recorded using an oil/water interface probe (IP).
Well Purging	Groundwater was purged from each monitoring well using a disposable bailer for each well in accordance with Coffey SOP. During purging, groundwater was monitored for pH, Temperature, Dissolved Oxygen, Electrical Conductivity and Redox Potential. Groundwater sampling was conducted following the stabilisation of groundwater parameters, three well volumes had been purged, or the well was purged dry.
Sampling Method	Groundwater samples were recovered from each of the monitoring wells using a disposable bailer in accordance with Coffey SOP. Groundwater sampling sheets are provided in Appendix D.
Sample Splitting	Duplicate samples were collected by filling up two sample containers simultaneously.
Decontamination Procedure	The IP and water quality meter was decontaminated by scrubbing with Decon 90 solution and rinsed with potable water between wells. As disposable bailers were used for sampling, no decontamination of sampling equipment was required.
Sample Preservation	Samples were placed in laboratory supplied bottles containing appropriate preservatives with minimal headspace. Samples collected for metals were filtered in the field using 0.45µm disposable Waterra filter packs. Sample containers were immediately capped and placed in an insulated container filled ice. The samples were dispatched to NATA accredited laboratories under chain of custody control.

4.4. Quality Assurance/Quality Control

A quality assurance/quality control plan was designed to achieve predetermined DQOs and to demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated and the procedures for assessing the DQOs are met. A standalone Data Validation Assessment is presented within Appendix A.

The results of the Data Validation Assessment conclude that the data is directly usable for the purposes of this assessment.

4.5. Laboratory Details

Analysis was carried out by the following laboratories who hold NATA accredited analytical methods:

- Primary Laboratory – Eurofins MGT, Lane Cove West NSW
- Secondary Laboratory - ALS Laboratory, Smithfield NSW

5. Assessment Criteria

5.1. Health Investigation Levels

Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (the 'ASC NEPM') (NEPC, 2013), states that '*the selection and use of investigation levels should be considered in the context of the iterative development of a Conceptual Site Model*'. Based on information describing the proposed development, Coffey considers the proposed redevelopment of the site for the medical facility will introduce a number of different receptor groups, including:

- Construction workers during site development, and workers conducting future subsurface maintenance works.
- Adult workers within the medical facility once developed including medical staff, and other employees involved with the administration and support functions within the medical facility.
- Persons attending the medical facility, including sensitive populations (i.e. children and the elderly). It is anticipated that the duration of attendance of these receptors may vary from day visits to extended periods of time.
- Site visitors attending the site periodically for short durations to visit persons attending the medical facility.

Schedule B7 of the ASC NEPM (NEPC, 2013) states that the Health Investigation Levels (HIL) developed for the commercial/industrial land use scenario are not applicable to a site used frequently by more sensitive groups such as children and the elderly (i.e. hospitals and hospices). To account for these sensitive receptors, Coffey considers that the adoption of HIL consistent with a high density residential setting (HIL B) is reasonable, given:

- The HIL B criteria were derived to account for adults, children and infants who spend the majority of their time indoors within the premises, with some limited use of communal outdoor areas on site.
- Opportunities for direct access to soil on site will be minimal.
- The HIL B criteria are conservative, and hence appropriate for a Tier 1 assessment.

The reported soil analytical data was also compared to the HIL for a generic commercial/industrial setting to assess potential health risks to construction workers involved with the redevelopment of the site.

5.1.1. Health Investigation Levels - Soils

The HILs for soils were sourced from:

- NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM).
- Friebel and Nadebaum (2011); CRC Care Technical Report No. 10 – Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater.

Schedule B1 of the ASC NEPM (NEPC, 2013) provides HILs for various exposure settings. For compounds where the allowable soil vapour HSL exceeds the chemical constituent saturation concentration, Health Screening Levels (HSL) for direct contact pathways listed in Table B4 of CRC CARE Technical Report No. 10 (Friebel and Nadebaum; 2011) have been adopted as the health risk screening level for this assessment. The values adopted assume conservative characteristics regarding site conditions; namely, sandy soil profile and contamination occurring within the upper 1m of soil.

A summary of the adopted health-based soil investigation levels is provided in Table 5.1. Table 1 in Appendix E provide a summary of the laboratory data against the adopted health based soil investigation levels.

Table 5.1: Soil Investigation Levels – Human Health

Chemical Constituent	Sensitive Receptors within Medical Facility Adopted from HIL B & HSL B (mg/kg) [1]	Construction Workers & Future Maintenance Workers Adopted from HIL D & HSL D [1] (mg/kg)
Arsenic	500	3,000
Cadmium	150	900
Chromium (VI) [5]	500	3,600
Copper	30,000	240,000
Nickel	1200	6000
Lead	1200	1500
Zinc	60,000	400,000
Mercury	120	730
F1 (TRH C_6-C_9 excluding BTEX)	45	260
F2 (TRH C_{10}-C_{16} excluding Naphthalene)	110	9,000 [2,3]
F3 TRH C_{16}-C_{34}	5,800 [2]	27,000 [2]
F4 TRH C_{34}-C_{40}	8,100 [2]	38,000 [2]
Benzene	0.5	3
Toluene	160	99,000 [2]
Ethylbenzene	55	27,000
Total Xylene	40	230
Naphthalene	3	NL
Carcinogenic PAH as Benzo(a)pyrene TEQ [4]	4	40
Total PAHs	400	4,000
Total PCB	1	7
Asbestos (as Bonded ACM or asbestos fines)	No visible asbestos identified	
Aldrin + Dieldrin	10	45
Chlordane	90	530
DDT+DDE+DDD	600	3,600
Endrin	20	100
Heptachlor	10	50
Hexachlorobenzene	15	80

Chemical Constituent	Sensitive Receptors within Medical Facility Adopted from HIL B & HSL B (mg/kg) [1]	Construction Workers & Future Maintenance Workers Adopted from HIL D & HSL D[1] (mg/kg)
Methoxychlor	500	2,500
Toxaphene	30	160

Notes:

1. Schedule B(1), Guideline on the Investigation Levels for Soil and Groundwater (NEPC, 1999) unless stated otherwise.
2. Table A4 – Soil Health Screening Levels for Direct Contact (CRC Care Technical Report No.10 (Friebel and Nadebaum; 2011)
3. HSL D criteria for TRH F2 derived by subtracting the HSL D criteria for Naphthalene (11,000mg/kg) from the HSL D criteria for TRH C10-16 (20,000mg/kg).
4. TEQ = Toxicity Equivalent Quotient
5. Soils were tested for Total Chromium, which comprises both Chromium (III) and Chromium (VI) valence states. The HIL for Chromium (VI) has been adopted as a conservative assessment threshold.

5.1.2. Health Investigation Levels - Groundwater

The nature of the proposed development will restrict human exposure to groundwater via direct pathways (e.g. incidental ingestion, dermal contact). Coffey understands that groundwater abstraction is not proposed as part of the development.

The ASC NEPM (NEPC, 2013) presents groundwater HSL for vapour intrusion pathway. The field investigations recorded standing water levels in BH2 and BH3 to be 1.1m and 1.4mbgs (i.e. approx. RL 76m). Given that the development will form substantial undercroft below the proposed development and the lower car park levels will be situated at RL 87.5m (i.e. +11.5m), groundwater data was compared to groundwater HSL for a residential setting (HSL A & HSL B), assuming a sandy soil with groundwater table greater than 8m.

5.2. Ecological Investigation Levels

5.2.1. Soil

Extensive landscaping is not proposed as part of the proposed development. Landscaping currently exists within the site, in the form of a number of mature trees and ruderal vegetation along the former quarry face. Given that existing landscaping will be removed as part of site redevelopment, and replaced by landscaping within designated planter boxes/tree pits in imported growing medium, it is assessed that the ecological investigation levels (EIL) and ecological screening levels (ESL) set out within the ASC NEPM (NEPC, 2013) are not considered applicable for the site.

5.2.2. Groundwater Investigation Levels (GIL)

The Guidelines for the Assessment and Management of Groundwater Contamination (NSW DECC, 2007) state that 'water quality objectives should always protect the groundwater quality to a level that meets the most sensitive end user's requirements'. The following beneficial uses of water within and down hydraulic gradient of the site were identified:

- Abstraction bore located approximately 200m south of the site within North Shore Hospital grounds. This bore abstracts groundwater for 'domestic' purposes from a depth of 180mbgs, and status is unknown.
- Gore Creek, a freshwater tributary of the Lane Cove River, located approximately 650m south west of the site.

On this basis, the groundwater investigation levels (GILs) adopted for this assessment are based on the following guidelines:

- ANZECC and ARMCANZ (2000). National Water Quality Management Strategy, Australian Water Quality Guidelines for the Protection of Aquatic Ecosystems.
- National Health and Medical Research Council and Natural Resource Management Ministerial Council (2011); Drinking Water Guidelines.

The ANZECC/ARMCANZ (2000) guidelines provide Trigger Values for organic and inorganic chemicals in freshwater and marine aquatic environments. The nearest surface water receptor is the freshwater Gore Creek which is likely to have been impacted (to varying degrees) by urban run-off. As such, the screening criteria selected for the site are the freshwater aquatic criteria for moderately disturbed ecosystems (95% level of protection).

ANZECC/ARMCANZ (2000) states that there is currently insufficient data to derive high reliability trigger values for various contaminants. For these contaminants, low reliability trigger values have been adopted as initial screening levels.

ANZECC/ARMCANZ (2000) states that there is currently insufficient data to derive a high reliability trigger value for TPH but propose a low reliability trigger value for TPH of 7µg/L. This guideline is generally considered by industry to be overly conservative and is also well below the TPH detection limit that most laboratories can achieve. Therefore the LOR is adopted as an appropriate screening trigger for TPH assessment (NSW DECC, 2007).

Although reticulated drinking water is readily available in St Leonards and areas surrounding the site, it is considered appropriate to assess groundwater quality against the health-based guideline values presented in the Drinking Water Guidelines (NHMRC/NRMMC, 2011) to reflect potential health risks associated with consumption of groundwater via the licensed groundwater bore in use within the adjoining hospital for domestic purposes.

NSW DECC (2007) Guidelines for the Assessment and Management of Groundwater Contamination states that where the generic groundwater assessment criterion is below the laboratory LOR, the LOR should be used instead of the existing generic investigation levels.

A summary of the adopted groundwater investigation levels is presented in Table 5.2. Groundwater results are summarised in Table 2 in Appendix E, which illustrates the comparison between the groundwater analytical data and the groundwater investigation levels outlined below.

Table 5.2: Summary of Groundwater Investigation Levels

Analyte	Laboratory Limit of Reporting (µg/L)	ANZECC 2000 95% Trigger Values[1] (µg/L)	Drinking Water Guidelines[2] (µg/L)	Adopted Groundwater Investigation Level (µg/L)
Arsenic	1	13	10	10
Cadmium	0.1	0.2	2	0.2
Chromium	1	1	50	1
Copper	1	1.4	2,000	1.4
Lead	1	3.4	10	3.4
Mercury	0.1	0.6	1	0.6
Nickel	1	11	20	11
Zinc	5	8	-	8
Benzo(a)pyrene	1	0.1[(LR*)]	0.01	1[(a)]
Naphthalene	1	16	-	16
Anthracene	1	0.01[(LR)]	-	1[(a)]

Analyte	Laboratory Limit of Reporting (µg/L)	ANZECC 2000 95% Trigger Values[1] (µg/L)	Drinking Water Guidelines[2] (µg/L)	Adopted Groundwater Investigation Level (µg/L)
Phenanthrene	1	0.6(LR*)	-	1(a)
Fluoranthene	1	1(LR*)	-	1
TPH C_6-C_9	20	-	-	20 (b)
TPH C_{10}-C_{14}	50	-	-	50 (b)
TPH C_{15}-C_{28}	100	-	-	100 (b)
TPH C_{29}-C_{36}	100	-	-	100 (b)
Benzene	1	950	1	1
Toluene	1	180 (LR)	800	180
Ethylbenzene	1	80 (LR)	300	80
Xylene (m&p)	2	75(LR)(c)	-	75(LR)(c)
Xylene (o)	1	350(LR)	-	350
Xylenes	3	-	600	600
VOC	Various	-	-	LOR

Notes:

(1) Australian and New Zealand Environment and Conservation (2000) National Water Quality Management Strategy - Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Trigger values under the 95% protection level for freshwater – where biological or chemical data has not been gathered for a slightly to moderately disturbed ecosystem.

(2) National Health and Medical Research Council and Natural Resource Management Ministerial Council (2011) Drinking Water Guidelines.

(LR) Low Reliability trigger values for 95% protection level, due to its potential bioaccumulation effects, recommended by ANZECC/ARMCANZ (2000). To be used as an indicative interim working level only.

(LR*) Low Reliability trigger values for 99% protection level, due to its potential bioaccumulation effects, recommended by ANZECC/ARMCANZ (2000) for slightly to moderately disturbed systems. To be used as an indicative interim working level only.

(a) As the practical limit of reporting is above the nominated groundwater investigation level for this analyte, the laboratory limit of reporting will be used as the investigation levels (NSW DECC, 2007).

(b) In the absence of a nominated guideline value, the laboratory LOR has been taken as the nominal trigger value for the presence of TPH compounds in groundwater as will be used as the investigation levels (NSW DECC, 2007).

(c) Trigger level adopted for Xylene (m&p) is the low reliability trigger level for Xylene (m) as set out within ANZECC (2000).

5.3. Soils – Other Considerations

5.3.1. Aesthetic Criteria

Although no specific numeric aesthetic guideline values are provided, NEPC (2013) requires the consideration of aesthetic issues (as a result of contamination), arising from soils within the site. The following assessment criteria were adopted when considering soil aesthetics:

- no highly malodourous soils, taking into consideration the natural state of the soil;
- no staining or discolouration in soils , taking into consideration the natural state of the soil; and
- no large or frequently occurring foreign materials present (to the extent practicable);

5.3.2. Management Limits

In accordance with Section 2.9 of NEPM Schedule B1, consideration of Management Limits has been undertaken to assess whether the reported soil conditions has the potential to pose a potential risk to buried infrastructure, fire and explosion hazards, or the formation of NAPL. A summary of the adopted management limits for this site is provided in Table 5.3.

Table 5.3: Summary of site management limits considered within this assessment

TRH Fraction	Soil Type	Management Limit for a Residential Setting (mg/kg)
F1: TRH C_6-C_{10}	Coarse	700
F2: TRH C_{10}-C_{16}	Coarse	1,000
F3: TRH C_{16}-C_{34}	Coarse	2,500
F4: TRH C_{34}-C_{40}	Coarse	10,000

6. Ground Conditions

6.1. Subsurface Conditions

Ground conditions encountered at the quarry floor comprised a thin layer of fill overlying sandstone bedrock. The fill materials encountered comprised sandy Clay to silty/clayey Sand and ranged in thickness from 0.4m and 1.1m. The bedrock was encountered at RL 76.5m to RL 72.6m and was described as typically fine to medium grained, high strength sandstone with dark grey laminations, interpreted to be Mittagong Formation, grading to Hawkesbury Sandstone at depth.

Available aerial photographs indicate that quarrying extended close to the southern boundary of the site. The exposed quarry walls are steeply sloping and expose a typical residual soil and deeply weathered shale bedrock profile. Deterioration of the quarry face has resulted in an accumulation of debris at the toe of the slope and existing retaining walls.

The former helipad present within the southern portion of the site appears to have been formed loosely to moderately compacted fill, which typically comprised silty Clay with varying gravel content. The thickness of fill recorded at BH1 was 19.5m, which reduced to approximately 1m to 3m in boreholes positioned along the site sit boundary (i.e. BH4, BH6, BH7 and BH8)

A generalised ground model interpreting the findings of the investigation is presented in Figure 3. It is noted however that the quality of fill and batter angles of the former quarry face in the southern corner of site are unknown, and have only been partially assessed by the borehole drilling due to access constraints.

Borehole logs are presented in Appendix B.

As part of the investigation, GPR techniques were used to estimate the extent of the UST present within the southern portion of the site. In summary, the GPR survey was inconclusive suggesting the UST is situated directly beneath the concrete pad, if still present within the site.

6.2. Visual/Olfactory Indications of Contamination

No olfactory of visual evidence of contamination was found in any of the boreholes, with the exception of a slight diesel odour detected in BH1 at 18.5mbgs. No staining was observed and soil headspace measurements were 3.2 and 3.3ppm. Given the depth of this observation and the proximity to the underlying weathered siltstone, it is considered plausible the odour derives from auger drilling through fill (i.e. which has likely derived from the quarrying operations), rather a man-made source.

No materials suspected to contain asbestos were observed in soils encountered during drilling[1].

Soil headspace measurements from soil samples collected from each sampling location within the vicinity of the UST ranged from 2.1ppm to 126ppm, with most readings less than 20ppm which indicates that there is a low potential for volatile organic compounds to be present in those soil samples. The highest reading corresponded with the sample collected from BH6 (4mbgs) where no odour was noted. Sample BH6 (4mbgs) was subsequently submitted for laboratory analysis where

[1] Coffey recognise that augered boreholes have limitations when characterising fill materials, as they are less conducive to allowing anthropogenic inclusions (including potential asbestos containing materials) than other investigation methods such as test pitting. Coffey considers that uncertainty associated with the presence of potentially unidentified contamination between investigation positions and limitations of the investigation methods can be addressed as part of contingency planning to manage unexpected finds of contamination during the proposed development works.

trace concentrations of TPH C_{10}-C_{16} were detected. Other chemical indicators associated fuel hydrocarbons were reported below the LOR, indicating the elevated PID reading may derive from auger drilling through weathered siltstone, rather than the UST.

Soil headspace readings within sampling locations within the remainder of the site were below 10ppm, indicating there is a low potential for volatile organic compounds to be present in soil encountered at these sampling locations.

Soil headspace measurements are presented in borehole logs provided in Appendix B.

6.3. Groundwater Conditions

Groundwater inflow was not encountered in any of the boreholes. Standing water levels were recorded in BH2 and BH3 at depths of 1.1m (RL 75.9m) to 1.4mbgs (RL 75.6m), respectively.

Groundwater samples were observed to range between clear and slightly cloudy, which was attributed to fine sediment suspended in solution. No odours or sheens were observed in any of the groundwater purged from the monitoring wells or in samples submitted for laboratory analysis.

Table 6.1 provides a summary of the water quality parameters measured from monitoring wells installed across the site.

Table 6.1: Summary of Water Quality Parameters

Parameter	Range	Comment
Dissolved oxygen (DO)	4.1mg/L (BH3) to 4.4mg/L (BH2)	Indicative of low dissolved oxygen levels for the water temperatures recorded.
Electrical conductivity (EC)	976uS/cm (BH3) to 1,035uS/cm (BH2)	Indicative of freshwater
Redox Potential	23mV (BH3) to 31mV (BH2)	Indicative of slightly oxidising conditions
pH	7.1 (BH3) to 7.2 (BH2)	Indicative of neutral conditions
Temperature	21.4°C to 22.4°C	-

6.4. Comparison of Analytical Results with Assessment Criteria

Soil and groundwater analytical results are summarised in Tables 1 and 2 in Appendix E. Certified laboratory reports and Chain of Custody records are included in Appendix F. A summary of this assessment is presented below:

- The concentrations of the COPCs in soil samples were less than the adopted health assessment criteria presented in Table 5.1.
- Concentrations of COPCs in groundwater were below the health and ecological assessment criteria presented in Table 5.2.
- Acetone was reported at a concentration of 10ug/L in the sample of groundwater collected from BH2. As no assessment criteria for Acetone is published within ANZECC (2000), the LOR of 1ug/L was adopted as a preliminary screening level. The USEPA has published a Tap Water Regional Screening Level (RSL) of 14,000ug/L for Acetone. Given that Tap Water RSLs are generally derived to be protective of the inhalation (i.e. volatilisation of compounds during bathing/showering), ingestion and dermal contact pathways, and are intended to be protective of

children, it is assessed that the concentration of Acetone in the sample collected from BH2 does not pose a significant risk to health.

- Given the distance between the site and nearest surface water receptor, and that Acetone is susceptible to relatively rapid biodegradation (IPCS, 1997), it is assessed that the reported concentration of Acetone in BH2 do not pose a significant risk to aquatic ecosystems within Gore Creek.
- Concentrations of TRH were not reported above the Management Limits adopted for this site.
- Based on observations made during the fieldwork, and those presented within the borehole logs, it is assessed that the soils are unlikely to present aesthetic issues if these materials are reused within the site.

6.5. Preliminary Waste Classification

The preliminary waste classification of soil materials encountered during the investigation works was conducted in general accordance with the procedures for classifying waste as detailed in the Waste Classification Guidelines - Part 1: Classifying Waste (NSW EPA, 2014). According to the Waste Classification procedure:

- The soil materials encountered in each sampling location are not classified as special waste as described within the Waste Classification Guidelines.
- The materials are not a liquid waste;
- The materials do not possess hazardous characteristics as defined under the Australian Code for the Transport of Dangerous Goods by Road and Rail;
- The materials consisted predominantly of soil and thus is deemed to be non-putrescible; and
- Soil material observed was not considered to be consistent with wastes that are currently pre-classified by the NSW EPA.

Chemical characterisation of the soil materials was undertaken to evaluate the waste classification of this material. Table 3 in Appendix E presents a comparison of the laboratory results with the criteria set out within Waste Classification Guidelines – Part 1 Classifying Waste (NSW EPA, 2014). In summary, the analysis of soil samples reported concentrations of COPC's below the respective CT1 assessment thresholds for all COPCs, indicating the fill and natural soils would provisionally classify as General Solid Waste (non-putrescible). This advice should be considered preliminary however given the limited sampling density achieved within the floor or the quarry, and access restrictions preventing sampling of fill material along the slope batter.

6.6. Virgin Excavated Natural Material Assessment

Virgin excavated natural material (VENM) has been defined as natural material (such as clay, gravel, sand, soil or rock fines):

- that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities; and
- that does not contain sulfidic ores or soils, or any other waste, and
- includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

A review of Acid Sulfate Soil Risk Map indicates there is a low risk of encountering acid sulphate soils within the site. A review of investigation records indicates that alluvial deposits were not encountered on site during this investigation.

Field observations and laboratory analytical results indicate that no evidence of wastes or indications of contamination were observed the natural residual soils and underlying bedrock. Samples of residual soils and weathered bedrock reported concentrations of organic COPCs less than the laboratory limit of reporting, with the exception of BH6 (4mbgs) which recorded trace concentrations of TRH C_{10}-C_{16}. Concentrations of heavy metals analysed were within background ranges published in Field Geologists Manual (Australasian Institute of Mining & Metallurgy, 2011, 5th Ed.). With the exception of soils surrounding the UST, the residual soils and bedrock do not appear to have been contaminated with manufactured chemicals or other process residues.

With the exception of soils surrounding the UST, it is assessed that the natural residual soils and underlying bedrock would classify as VENM, provided the natural soil and bedrock is not mixed with fill materials, wastes or any other materials that display evidence of contamination (e.g. anthropogenic material, staining, discolouration or odours). It is recommended that a visual assessment of these materials is undertaken during excavation and removal of existing structures/vegetation to confirm it is broadly consistent with that recorded within the boreholes. If material being excavated is observed to be different from that described in this investigation and/or shows evidence of potential contamination (e.g. staining, odours, discolouration, buried wastes), such materials should be segregated and further assessed by a suitably qualified environmental consultant.

The chemical data collated as part of this investigation indicates the fill material may also classify as Excavated Natural Material (ENM), although further assessment of this material would be required to confirm this classification in accordance with the Excavated Natural Material Order 2014. We also note that this additional assessment would need to consider the fill along the batter, which has not been adequately characterised to confirm an ENM classification.

7. Conclusions and Recommendations

7.1. Summary

The site is currently situated at two distinct levels arising from historic quarrying operations. Dexus are seeking to redevelop the site as a five to six storey medical centre, which extends over the exposed face of the former quarry.

The floor of the former quarry occupies the northern portion of the site, where commercial warehouses associated with the St Leonards Business Centre are present. These structures were established on site during the mid-1970's and at the time of the investigation, were in use as an Australian Post depot.

The crest of the quarry is situated within the southern portion of the site and was unoccupied at the time the investigation was conducted. Observations made during the investigation suggest this part of the site had been used as a helipad associated with the adjoining North Shore Hospital. A small brick structure and UST with associated hand pump and vent pipe were present adjacent to the helipad.

The centre of the site is occupied by steep, partially vegetated quarry walls, which expose a typical residual soil and deeply weathered shale bedrock profile.

A Phase 1 Preliminary Site Investigation (Coffey, Oct 2015) was prepared for the site and additional land to the north comprising the remainder of the St Leonards Business Centre. This study identified a number of potential sources of contamination, including former quarrying operations, fuel storage (on/off-site), fill materials and a former printing workshop (off-site). Coffey undertook a programme of investigation to assess the significance of the potential sources of contamination in the context of the proposed development. In summary, the investigation has not identified concentrations of COPCs in soil or groundwater samples above the adopted health or ecological investigation criteria.

7.2. Conclusions

Based on the findings of this investigation, it is assessed that the site is suitable for the proposed medical centre development described herein, in accordance with Clause 7 of SEPP55.

The laboratory analytical data collated as part of the investigation indicates that fill, residual soil and weathered bedrock would likely classify as General Solid Waste (non-putrescible) where soils generated as part of the development works are surplus and require disposal off site to a licensed landfill.

In general, natural residual soils and underlying bedrock would classify as VENM, provided these materials are not mixed with fill materials, natural soils surrounding the UST within the southern portion of the site, wastes or any other materials that display evidence of contamination (e.g. anthropogenic material, staining, discolouration or odours). It is recommended that a visual assessment of these materials is undertaken during excavation and following the removal of existing structures/vegetation to confirm it is broadly consistent with that recorded within the boreholes.

Coffey note that the fill material may also classify as ENM, although further assessment of this material would be required to confirm this classification in accordance with the Excavated Natural Material Order 2014.

7.3. Recommendations

The investigation methods employed augered boreholes, predominantly to characterise the extensive fill profile and underlying bedrock to inform the design of the proposed development. Access restrictions also limited the number of sampling locations established within the floor of the former

quarry, and prevent sampling of soils exposed along the batter. These factors introduce limitations to effectively characterise fill materials.

Coffey considers that uncertainty associated with the presence of potentially unidentified contamination between investigation positions and limitations of the investigation methods can be addressed as part of contingency planning to manage unexpected finds of contamination during the proposed development works. The following recommendations are made in consideration of the investigation findings and inherent uncertainties noted above:

- **Hazardous Building Materials Survey** – completed prior to the demolition of the structures currently present on site. Once the results of the Hazardous Materials Survey are available, these findings should be reviewed by an environmental consultant and used to develop appropriate controls within the Construction Environmental Management Plan.
- **Construction Environmental Management Plan (CEMP)** – developed to inform contractors undertaking the proposed upgrade works of the known and reasonably likely environmental constraints, including potentially contaminated materials that may be present within the site. It is recommended that the CEMP include the following procedures:
    - Procedures to remove hazardous materials (if any) prior to demolishing the existing structures on site. This should include controls to minimise the potential for cross contamination and expose occupants of land surrounding the site.
    - Procedures to remove the hand pump and vent, and UST (where present) within the southern portion of the site. These procedures should include guidance to remove impacted soils surrounding the UST (if any).
    - Procedures for managing and/or classifying spoil generated from the development for beneficial use, or disposal off site. This should include inspections of fill and natural soils following the removal of existing structures and vegetation.
    - An unexpected finds management protocol. The unexpected finds protocol should include procedures and protocols for managing risks and protecting human health and environment should unexpected finds of contamination be identified at the Site
    - Site access controls to prevent unauthorised access during construction.

It is recommended that the CEMP is prepared by an appropriate qualified environmental consultant.

References

ANZECC/ARMCANZ (2000). *Australian Water Quality Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra, October 2000.

Australasian Institute of Mining & Metallurgy (2011), Field Geologists Manual (5th Ed.)

Coffey (Oct 2015); *Phase 1 Preliminary Site Investigation; 12 Frederick Street, St. Leonards* (Ref: GEOTLCOV25513AA; dated 9th October 2015)

Dept. of the Environment, UK (1996); *Industry Profile: Ceramics, Cement & Asphalt Manufacturing Works*

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Friebel & Nadebaum (2011). *Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater* (technical paper No.10) Guidelines, CRC for Contamination Assessment and Remediation of the Environment (CRC CARE)

IPCS (1998); *Environmental Health Criteria 207 – Acetone* (International Programme on Chemical Safety; Available: http://www.inchem.org/documents/ehc/ehc/ehc207.htm)

NEPC (2013) *National Environmental Protection (Assessment of Site Contamination)* Measure 1999, as amended in 2013, National Environment Protection Council.

NHMRC/NRMMC (2011). *National Water Quality Management Strategy, Australian Drinking Water Guidelines*, National Health and Medical Research Council and National Resource Management Ministerial Council

NSW DEC (2006); *Guidelines for the NSW Site Auditor Scheme*, 2nd edition

NSW DEC (2007); *Guidelines for the Assessment and Management of Groundwater Contamination*

NSW OEH (2011); *Guidelines for Consultants Reporting on Contaminated Sites*

NSW EPA (1995); Sampling Design Guidelines

NSW EPA (2014); *Waste Classification Guidelines – Part 1 Classifying Waste*

NSW EPA (2014); *Excavated Natural Material Order 2014*.

Standards Australia (1993); AS1726 *Geotechnical Site Investigations.*

Standards Australia (2005). AS 4482.1 *Guide to the Sampling and Investigation of Potentially Contaminated Soil*. Part 1: Non-volatile and semi-volatile compounds, , Standards Australia, Homebush NSW.

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 appraised 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 statues 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

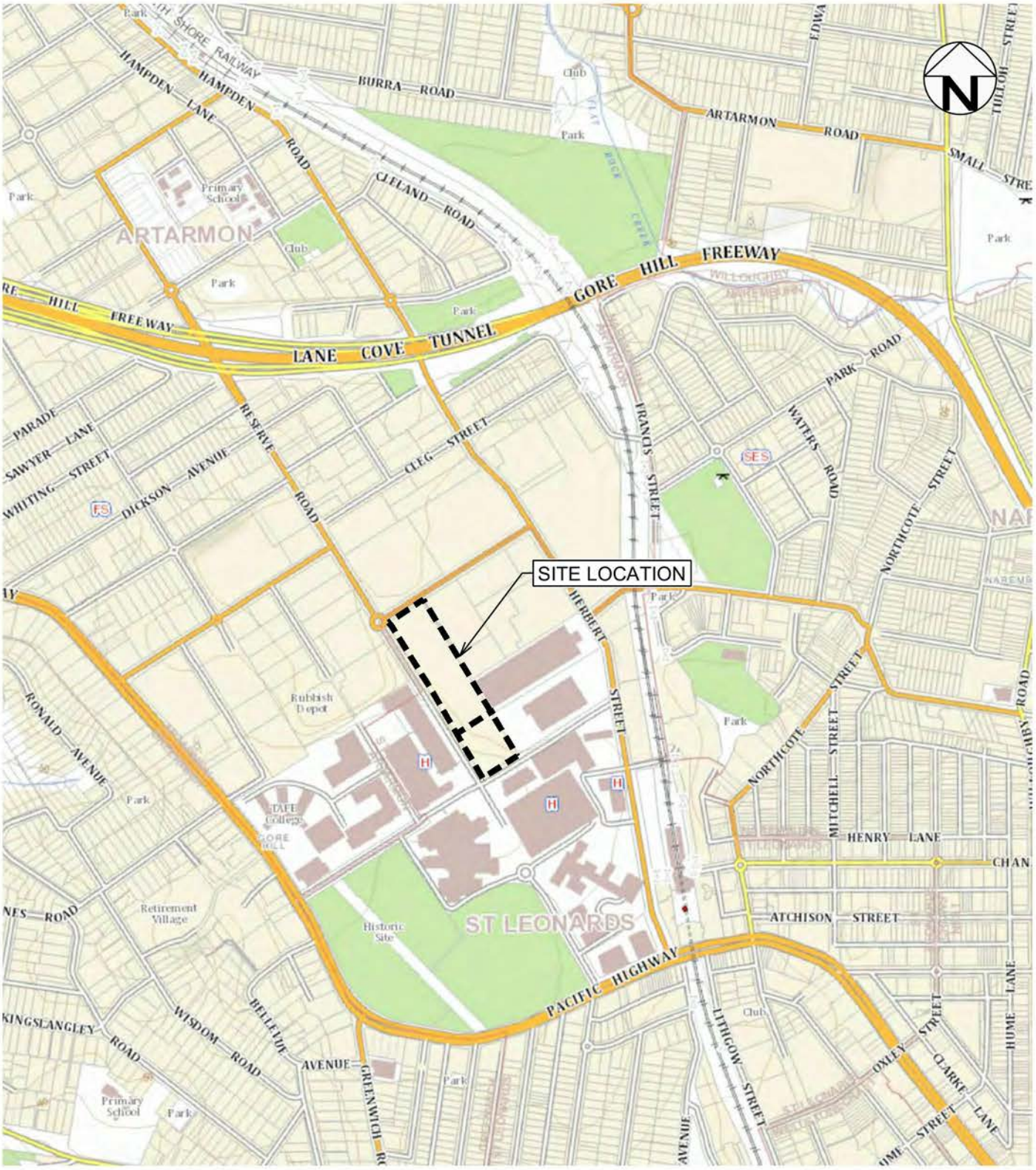
The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field 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.

Figures



LEGEND

APPROXIMATE BOREHOLE LOCATION

100 0 100 300 500

Scale (metres) 1:10 000

drawn	KW / FA
approved	-
date	14 / 04 / 16
scale	AS SHOWN
original size	A4

coffey
A TETRA TECH COMPANY

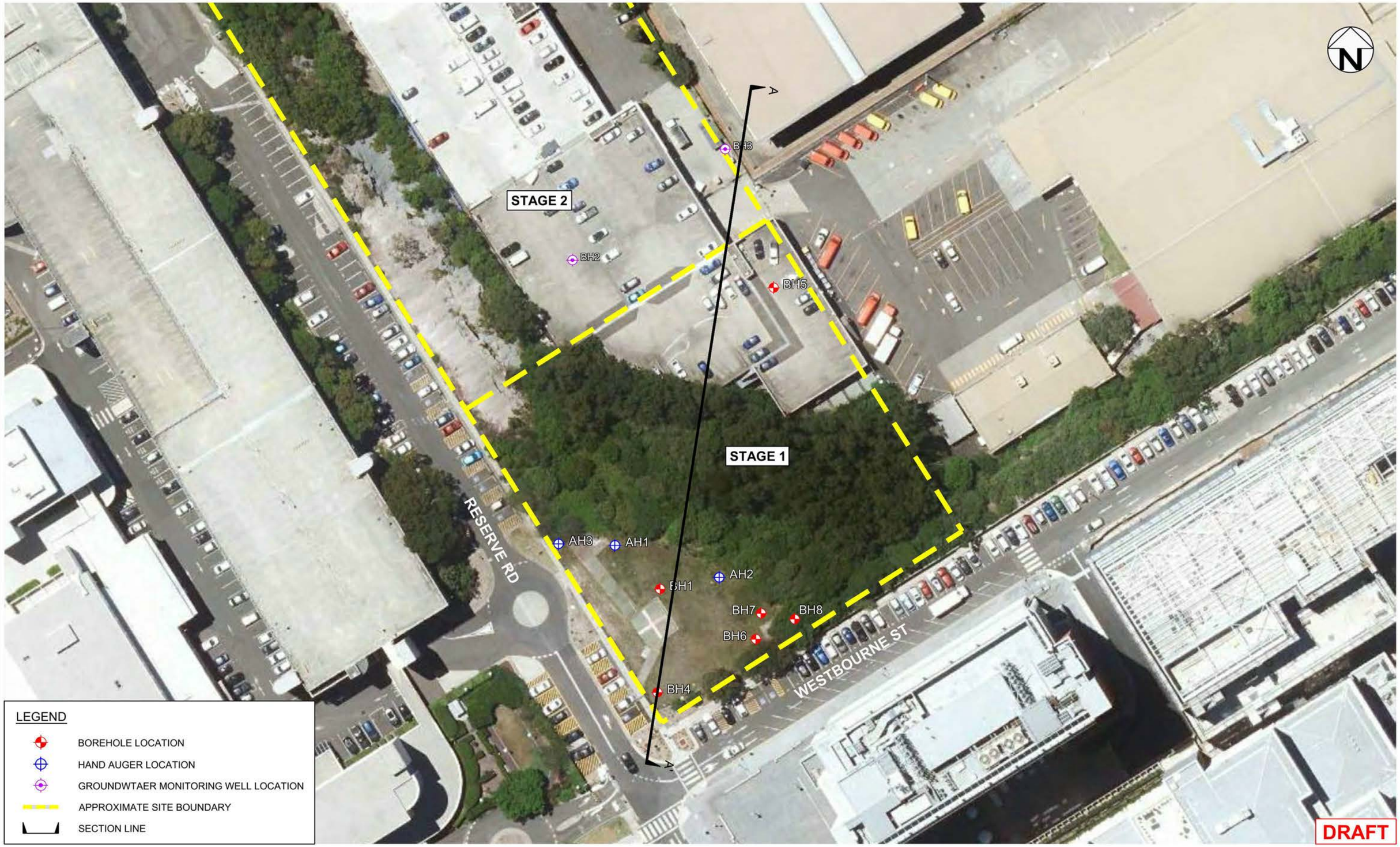
client: DEXUS PROJECTS PTY LTD

project: GEOTECHNICAL INVESTIGATION PLAN
12 FREDRICK ST, ST LEONARDS, NSW

title: SITE LOCATION PLAN

project no: GEOTLCOV25513AB-AC | figure no: FIGURE 1 | rev: A

PLOT DATE: 14/04/2016 8:57:57 AM DWG FILE: F:\GEOTECHNICS\1 PROJECTS\GEOTLCOV25\GEOTLCOV25513AB 12 FREDERICK ST ST LEONARDS\CAD\GEOTLCOV25513AB-AC.DWG



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

10 0 10 20 30 40

Scale (metres) 1:750

drawn	KW / FA
approved	-
date	14 / 04 / 16
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: DEXUS PROJECTS PTY LTD

project: GEOTECHNICAL INVESTIGATION PLAN
12 FREDRICK ST, ST LEONARDS, NSW

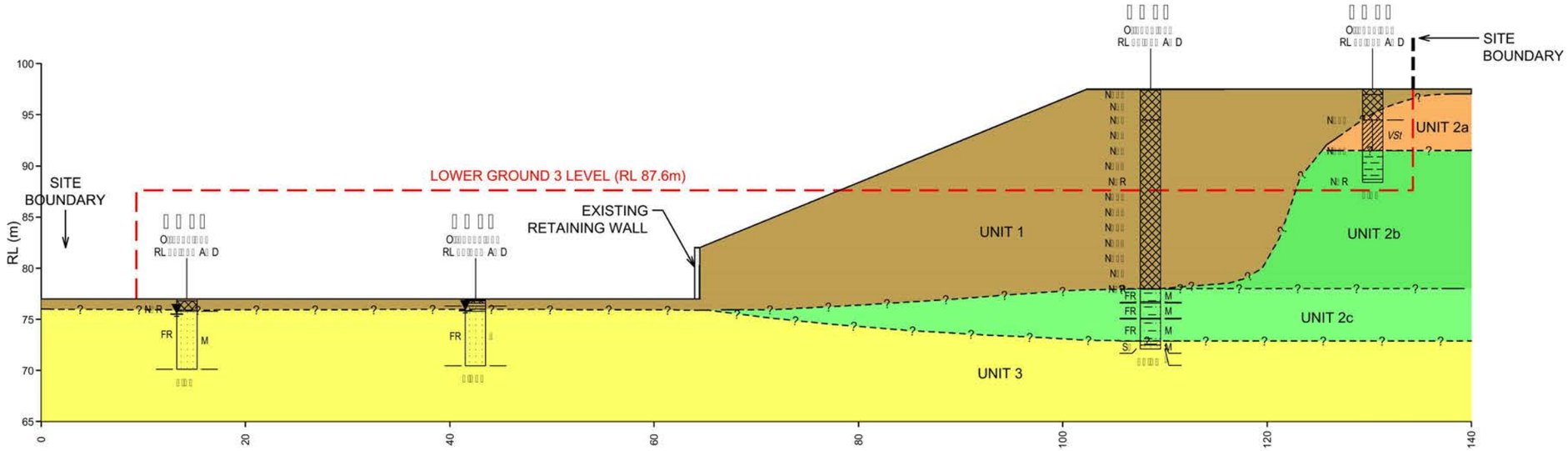
title: BOREHOLE LOCATION PLAN

project no: GEOTLCOV25513AB-AC | figure no: FIGURE 2 | rev: A

PLOT DATE: 14/04/2016 8:57:02 AM DWG FILE: F:\GEOTECH\NICS\1.PROJECTS\GEOTLCOV25\GEOTLCOV25513AB 12 FREDERICK ST ST LEONARDS\CAD\GEOTLCOV25513AB-AC.DWG

NORTH

SOUTH



SECTION A-A'

LEGEND

- TOPSOIL
- FILL
- SILTY CLAY
- SILTSTONE
- NO CORE
- INTERBEDDED SILTSTONE & SANDSTONE
- SANDSTONE
- CONCRETE
- SHALE
- EXISTING GROUND SURFACE
- INFERRED GEOLOGICAL BOUNDARY
- WATER LEVEL
- N*=17 STANDARD PENETRATION TEST RESULT

UNIT LEGEND

- UNIT 1 - FILL
- UNIT 2a - RESIDUAL SOIL
- UNIT 2b - WEATHERED SHALE BEDROCK
- UNIT 2c - FRESH SHALE/SILTSTONE
- UNIT 3 - SANDSTONE

NOTES:
1. ELEVATION ARE APPROXIMATED FROM CLIENT PROVIDED SURVEY PLANS.
2. BOREHOLES ARE OFFSET FROM SECTION LINE.
3. ALL MATERIAL BOUNDARIES ARE INTERPOLATED FROM INVESTIGATION LOCATIONS, SITE CONDITIONS MAY VARY FROM INFERRED GEOLOGICAL BOUNDARIES.

DRAFT

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

10 0 10 20 30 40

Scale (metres) 1:750

drawn	KW / FA
approved	-
date	14 / 04 / 16
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: DEXUS PROJECTS PTY LTD

project: GEOTECHNICAL INVESTIGATION PLAN
12 FREDRICK ST, ST LEONARDS, NSW

title: SECTION A-A'

project no: GEOTLCOV25513AB-AC | figure no: FIGURE 3 | rev: A

PLOT DATE: 14/04/2016 8:56:43 AM DWG FILE: F:\GEOTECHNICS\51 PROJECTS\GEOTLCOV25\GEOTLCOV25513AB 12 FREDERICK ST ST LEONARDS\CAD\GEOTLCOV25513AB-AC.DWG

Appendix A - Data Validation Report

Coffey Environments Australia Pty Ltd

A.B.N. 65 140 765 902

DATA VALIDATION REPORT

Job No: GEOTLCOV25513AB-AC

Soil Analysis - Lab Batch References: 493095, 493308, 493355, 493572, 494235, 494679, 1606329

Groundwater Analysis - Lab Batch References – 495191

I. SAMPLE HANDLING

	Yes	No (Comment below)
1. Were the sample **holding times** met?	☒	☐
2. Were the samples in **proper custody** between the field and reaching the laboratory?	☒	☐
3. Were the samples **properly and adequately** preserved? *This includes keeping the samples chilled, where applicable.*	☒	☐
4. Were the samples received by the laboratory in good condition?	☒	☐

COMMENTS:

Sample Handling was:

☒ Satisfactory ☐ Unsatisfactory

☐ Partially Satisfactory

Coffey Environments Australia Pty Ltd

A.B.N. 65 140 765 902

DATA VALIDATION REPORT

Job No: GEOTLCOV25513AB-AC

Soil Analysis - Lab Batch References: 493095, 493308, 493355, 493572, 494235, 494679, 1606329

Groundwater Analysis - Lab Batch References – 495191

II PRECISION/ACCURACY ASSESSMENT

	Yes	No (Comment below)
1. Was a NATA registered laboratory used?	☒	☐
2. Did the laboratory perform the requested tests?	☒	☐
3. Were the laboratory methods adopted NATA endorsed?	☒	☐
4. Were the appropriate test procedures followed?	☒	☐
5. Were the reporting limits satisfactory?	☐	☒
6. Was the NATA Seal on the reports?	☒	☐
7. Were the reports signed by an authorised person?	☒	☐

COMMENTS:

The limits of reporting (LOR) for a number of PAH compounds in groundwater were above the freshwater assessment criteria published in ANZECC (2000). The LOR was adopted as the alternate assessment criteria, which is consistent with the guidance provided in Guidelines for the Assessment and Management of Groundwater Contamination (NSW DECC, 2007).

Precision/Accuracy of the Laboratory Report	☒ Satisfactory	☐ Unsatisfactory
	☐ Partially Satisfactory	

Coffey Environments Australia Pty Ltd

A.B.N. 65 140 765 902

DATA VALIDATION REPORT

Job No: GEOTLCOV25513AB-AC

Soil Analysis - Lab Batch References: 493095, 493308, 493355, 493572, 494235, 494679, 1606329

Groundwater Analysis - Lab Batch References – 495191

III. FIELD QA/QC

1. Number of Samples Analysed — Soil 23; Groundwater: 2

2. Number of Days of Sampling: 5

3. Number and Type of QA/QC Samples Collected:

Quality Control Sample Type	No.	% Total No. Samples
Intra-lab Duplicates (Soil)	2	8.6%
Inter-lab Duplicates (Soil)	1	4.3%
Intra-lab Duplicates (Groundwater)	1	50%
Inter-lab Duplicates (Groundwater)	0	0%
Trip Blanks	2	-
Trip Spike	2	-
Equipment Rinsate	1	-

4. FIELD DUPLICATES

	Yes	**No** (Comment below)
A. Were an Adequate Number of field duplicates analysed for each chemical?	☒	☐
B. Were RPDs within Control Limits?		
a. Organics (No limit (<10 x LOR); 50% (10-20 x LOR); 30% (>20 x LOR))	☒	☐
b. Metals/Inorganics (No limit (<10 x LOR); 50% (10-20 x LOR); 30% (>20 x LOR))	☒	☐
c. Volatile & semi volatile organics (No limit (<10 x LOR); 50% (10-20 x LOR); 30% (>20 x LOR))	☒	☐

Coffey Environments Australia Pty Ltd

A.B.N. 65 140 765 902

DATA VALIDATION REPORT

Job No: GEOTLCOV25513AB-AC

Soil Analysis - Lab Batch References: 493095, 493308, 493355, 493572, 494235, 494679, 1606329

Groundwater Analysis - Lab Batch References – 495191

COMMENTS:

Calculated RPDs have been presented in Tables 4 and 5. In general the comparison of primary and duplicate samples demonstrated good reproducibility, when the LOR was considered.

Coffey Environments Australia Pty Ltd

A.B.N. 65 140 765 902

DATA VALIDATION REPORT

Job No: GEOTLCOV25513AB-AC

Soil Analysis - Lab Batch References: 493095, 493308, 493355, 493572, 494235, 494679, 1606329

Groundwater Analysis - Lab Batch References – 495191

IV. TRIP BLANKS (TB) AND TRIP SPIKES (TS)

	Yes	No (Comment below)
A. Were an Adequate Number of trip blanks and spikes analysed?	☒	☐
B. Were the trip blanks free of contaminants and trip spike were within acceptance limit?	☒	☐
C. Were the trip spikes reported within acceptable recoveries?	☒	☐

COMMENTS:

6. EQUIPMENT RINSATE SAMPLES

	Yes	No (Comment below)
A. Were an adequate number of Equipment Rinsate Samples collected?	☒	☐
B. Were the Equipment Rinsate Samples free of contaminants?	☒	☐

Field QA/QC was:	☒ Satisfactory	☐ Unsatisfactory
	☐ Partially Satisfactory	

Coffey Environments Australia Pty Ltd

A.B.N. 65 140 765 902

DATA VALIDATION REPORT

Job No: GEOTLCOV25513AB-AC

Soil Analysis - Lab Batch References: 493095, 493308, 493355, 493572, 494235, 494679, 1606329

Groundwater Analysis - Lab Batch References – 495191

V LABORATORY INTERNAL QUALITY CONTROL PROCEDURES

1. Type of QA/QC Samples

	Yes	No
Laboratory Blanks/Reagent Blanks	☒	☐
Laboratory Duplicates	☒	☐
Matrix Spikes/Matrix Spike Duplicates	☒	☐
Laboratory Control Spike	☒	☐
Surrogate (where appropriate)*	☒	☐

	Yes	**No** (Comment below)
2 Were the laboratory blanks/reagents blanks free of contamination?	☒	☐
3. Were the spike recoveries within control limits?		
a. Organics (70% to 130%)	☐	☒
b. Metals/Inorganic (70% to 130%)	☒	☐
4. Were the RPDs of the laboratory duplicates within control limits?	☐	☒
5. Were the surrogate recoveries within control limits?	☒	☐

COMMENTS:

- Lab RPDs between primary and duplicate samples were within the control limits when consideration of the reported concentrations and the laboratory limit of reporting.
- Spike recovery for TCE in Batch 495191 was reported outside the adopted control limits. The laboratory reported that as an acceptable recovery was obtained for the laboratory control sample, the elevated spike recovery is likely to be attributable to interference in the sample matrix.

The above discrepancies were considered minor in relation to the overall assessment of contamination at this site. Additionally, the duplicate samples RPD reported passes Eurofins MGT's QA acceptance criteria.

5. The laboratory internal QA/QC was:	☒ Satisfactory	☐ Unsatisfactory
	☐ Partially Satisfactory	

Coffey Environments Australia Pty Ltd

A.B.N. 65 140 765 902

DATA VALIDATION REPORT

Job No: GEOTLCOV25513AB-AC

Soil Analysis - Lab Batch References: 493095, 493308, 493355, 493572, 494235, 494679, 1606329

Groundwater Analysis - Lab Batch References – 495191

VI DATA USABILITY

1.	Data Directly Usable	☒
2.	Data Usable with the following considerations	☐
3.	Data Not Usable.	☐

COMMENTS:

Appendix B - Borehole Logs

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Engineering Log - Hand Auger

Borehole ID.	**AH01**
sheet:	1 of 1
project no.	**GEOTLCOV25513AB**
date started:	**16 Mar 2016**
date completed:	**16 Mar 2016**
logged by:	**KW**
checked by:	**AJH**

client: **Dexus Projects Pty Ltd**

principal:

project: **Geotechnical & Contamination Investigation**

location: **12 Fredrick Street, St Leonards**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Hand Auger | drilling fluid: | hole diameter :

drilling information | **material substance**

method & support	penetration (1 2 3)	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
HA		Not Observed	E E					**Silty CLAY**: low plasticity, dark grey, with rootlets, fine to medium grained, angular to sub-angular gravel, brick pieces, concrete pieces, rock fragments.	M ~Wp			**TOPSOIL** No odour, staining observed PID: 4.7 ppm
								FILL: Silty CLAY: high plasticity, dark grey with brown-red-orange mottling and pale grey, with some gravel and cobble sized shale pieces, low strength, highly weathered, dark grey.	<Wp			**FILL** No odour, staining observed PID: 5.5 ppm
				97	0.5			**FILL: Sandy CLAY**: low to medium plasticity, pale brown, sand is fine to medium grained, with some fine to coarse grained, angular to sub-angular gravel.				
								Hand Auger AH01 terminated at 0.4 m				
				96	1.0							
					1.5							
					2.0							
				95	2.5							
					3.0							
				94	3.5							

CDF_0_9_06_LIBRARY.GLB rev:AM Log COF BOREHOLE: NON CORED GEOTLCOV25513AB.GPJ <<DrawingFile>> 04/04/2016 11:51

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix, e.g. AD/T
- B blank bit
- T TC bit
- V V bit

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/remouded (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 - Hand Auger

Borehole ID.	**AH02**
sheet:	1 of 1
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **16 Mar 2016**
principal:	date completed: **16 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Hand Auger | drilling fluid: | hole diameter :

drilling information | **material substance**

method & support	penetration (1 2 3)	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
HA			E					**Silty CLAY**: low plasticity, dark grey, with rootlets, with some gravel, fine to medium, angular to sub-angular, brick pieces, rock fragments, shells.	M <Wp			**TOPSOIL** No odour, staining observed PID: 5.9 ppm
			E					**FILL: Silty CLAY**: medium plasticity, pale grey, pale brown with red-brown and yellow-brown mottling, with some gravel, fine to medium, angular to sub-angular.				**FILL** No odour, staining observed PID: 6 ppm
			E	97	0.5			0.3 m: with some fine to medium grained sand				PID: 6.5 ppm
								Hand Auger AH02 terminated at 0.55 m				
				96	1.0							
					1.5							
					2.0							
				95	2.5							
					3.0							
				94	3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix e.g. AD/T
- B blank bit
- T TC bit
- V V bit

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/remouded (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 - Hand Auger

Borehole ID.	**AH03**
sheet:	1 of 1
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **16 Mar 2016**
principal:	date completed: **16 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Hand Auger | drilling fluid: | hole diameter :

drilling information | **material substance**

method & support	penetration (1 2 3)	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
HA			E					**Silty CLAY**: low plasticity, dark grey, with rootlets, angular to sub-angular gravel, brick pieces, concrete pieces, rock fragments.	M			**TOPSOIL** No odour, staining observed PID: 9.6 ppm
									<Wp			
			E					**FILL: Silty CLAY**: medium plasticity, pale grey, dark grey, pale brown with yellow-brown mottling, with some gravel, fine to medium, angular to sub-angular, concrete pieces, rock pieces, brick pieces.				**FILL** No odour, staining observed PID: 6.5 ppm
			E	97	0.5			0.3 m: becoming pale red, pale grey and dark grey with yellow-brown mottling				PID: 7.9 ppm
								Hand Auger AH03 terminated at 0.55 m				
					1.0							
				96	1.5							
					2.0							
				95	2.5							
					3.0							
				94	3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix, e.g. AD/T
- B blank bit
- T TC bit
- V V bit

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/remouded (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.	**BH01**
sheet:	1 of 5
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **15 Mar 2016**
principal:	date completed: **16 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm

drilling information | **material substance**

method & support	penetration 1 2 3	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 CASING		Not Observed	E					**Silty CLAY**: low to medium plasticity, dark grey, with some fine to medium grained sand, rootlets, brick pieces.	M D			**TOPSOIL**
			SPT 5, 8, 12 N*=20	97	1.0			**FILL: Silty CLAY**: low plasticity, red brown, pale grey, with some sand, fien to medium grained, trace gravel, angular to sub-angular, fine to medium, trace rock fragments.				**FILL** PID: 1.1 ppm
			SPT 4, 2, 2 N*=4	96	2.0			1.5 m: becoming pale grey 1.8 m: becoming pale brown				PID: 0.6 ppm
			SPT 2, 2, 3 N*=5	95 94	3.0 4.0			**FILL: Silty CLAY**: high plasticity, pale grey, red-brown, with some gravel, angular to sub-angular, fine to medium.	~Wp			HP 160 - 260 kPa PID: 0.5 ppm HP 190 - 160 kPa
			SPT 2, 2, 3 N*=5	93 92	5.0							SPT 100mm recovered HP 200 kPa
			SPT 2, 2, 2 N*=4	91	6.0 7.0			6.0 m: becoming pale grey, red-brown, dark grey with orange-brown mottling				HP 180 kPa PID: 0.5 ppm HP 100 kPa
			SPT 3, 5, 6 N*=11	90								SPT 200mm recovered PID: 0.4 ppm HP 150 kPa

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

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/remouded (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.	**BH01**
sheet:	2 of 5
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **15 Mar 2016**
principal:	date completed: **16 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm

drilling information | **material substance**

method & support	penetration (1 2 3)	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 CASING		Not Observed		89	9.0			**FILL: Silty CLAY**: high plasticity, pale grey, red-brown, with some gravel, angular to sub-angular, fine to medium. *(continued)*	~Wp			**FILL**
			SPT 3/6mm, 6/5mm, 3 N*=R	88								PID: 0.3 ppm HP 150 kPa
					10.0							
			SPT 3, 3, 7 N*=10	87				10.5 m: becoming pale grey				HP 160 kPa PID: 0.5 ppm
				86	11.0							
			SPT 4, 5, 7 N*=12	85	12.0							No SPT sample recovered
					13.0							
			SPT 4, 6, 11 N*=17	84				13.5 m: becoming pale grey and red-brown with yellow-brown, dark grey, dark red mottling				PID: 0.1 ppm
				83	14.0							
			SPT 7, 11, 10 N*=21	82	15.0							HP 150 kPa HP 400 kPa HP 200 kPa

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method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
HA hand auger

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 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/remouded (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.	**BH01**
sheet:	3 of 5
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **15 Mar 2016**
principal:	date completed: **16 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm

drilling information | **material substance**

method & support	penetration 1 2 3	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 CASING		Not Observed	SPT 5, 7, 8 N*=15	81				**FILL: Silty CLAY**: high plasticity, pale grey, red-brown, with some gravel, angular to sub-angular, fine to medium. *(continued)*	~Wp			**FILL**
				80	17.0			16.6 m: becoming brown and dark grey with pale grey, black and pale red mottling, with some fine to coarse grained, angular to sub-angular gravel			X X	Light rotten odour HP 150 kPa HP 150 kPa
			SPT 4, 4, 5 N*=9	79	18.0							PID: 3.2 ppm
					19.0			18.4 m: becoming dark grey with pale grey and yellow-brown mottling with fine to medium grained, angular to sub-angular gravel			X	HP 130 kPa Light diesel odour
			SPT 17/50mm N*=R	78				Borehole BH01 continued as cored hole **SILTSTONE**: fine grained, dark grey, low strength, extremely to highly weathered.				**WEATHERED BEDROCK** PID: 3.3 ppm
				77	20.0							
				76	21.0							
				75	22.0							
				74	23.0							

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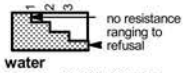
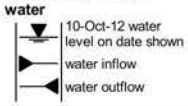
method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

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/remouded (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 - Cored Borehole

Borehole ID.	**BH01**
sheet:	4 of 5
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **15 Mar 2016**
principal:	date completed: **16 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm | vane id.:

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular	general
		81										
			17.0									
		80										
			18.0									
		79										
			19.0									
		78			start coring at 19.55m							
NMLC	Not Observed		20.0		**SILTSTONE**: dark grey-black, massive.	FR		a=1.57 d=0.98 a=3.37 d=0.77	53%		JT, 30 - 50°, PL, SO - RO, SN CS, 10 - 20°, PL, SO - RO, rock fragments JT, 20 - 40°, PL, SO - RO, SN JT, 20 - 40°, PL, SO - RO, SN - CO, rock fragments JT, 80 - 90°, PL, SO - RO, SN JT, 20 - 40°, PL, SO - RO, CN JT, 20 - 40°, PL, SO - RO, SN CS, 10 - 20°, IR, SO - RO, SN, rock fragments JT, 70 - 80°, PL, SO, CN PT, 0 - 10°, PL, SO - RO, CN PT, 0 - 10°, PL, SO - RO, CO, rock fragments JT, 10 - 20°, PL, SO - RO, CO, rock fragments JT, 10 - 20°, PL, SO - RO, CO, rock fragments JT, 40 - 60°, PL, SO - RO, CN PT, PL, SO - RO, Silty clay CO, rock PT, 0 - 10°, PL, SO - RO, CN CS, 0 - 10°, PL, SO - RO, 60 mm, rock fragments	Defects are: JT, 10 - 20°, PL, SO - RO, CN, unless otherwise described Defects are: PT, 0 - 10°, PL, SO - RO, CN, unless otherwise described
		77										
			21.0		**NO CORE:** 0.10 m				0%			
					SILTSTONE: dark grey-black, massive.	FR						
		76						a=1.43 d=1.22				
			22.0						22%			
		75			**NO CORE:** 0.10 m							
					SILTSTONE: dark grey-black, massive.	FR		a=1.69 d=0.52 a=1.18 d=1.19				
			23.0						63%			
		74						a=1.01 d=0.85				

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method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- HA hand auger

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn

RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CO contact
- CS crushed seam
- SM seam

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

coating
- CN clean
- SN stain
- VN veneer
- CO coating

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Engineering Log - Cored Borehole

Borehole ID.	**BH01**
sheet:	5 of 5
project no.	**GEOTLCOV25513AB**
date started:	**15 Mar 2016**
date completed:	**16 Mar 2016**
logged by:	**KW**
checked by:	**AJH**

client: ***Dexus Projects Pty Ltd***

principal:

project: ***Geotechnical & Contamination Investigation***

location: ***12 Fredrick Street, St Leonards***

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm | vane id.:

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observed	73			**SILTSTONE**: dark grey-black, massive. *(continued)*	FR					CS, 0 - 10°, PL, SO - RO, 20 mm JT, 10 - 20°, PL, SO - RO, CO PT, 0 - 10°, PL, SO - RO, CN CS, 0 - 10°, PL, SO - RO, 30 mm, rock fragments JT, 10 - 20°, PL, SO - RO, CO, rock fragments JT, 10 - 20°, PL, SO - RO, CO, rock fragments CS, 0 - 10°, PL, SO - RO, 50 mm, rock fragments SM, 0 - 10°, PL, SO - RO, Sandy clay CO, 50 mm
			25.0		**INTERBEDDED SILTSTONE & SANDSTONE**: dark grey and pale grey, siltstone is 50%, sandstone 50%, sandstone is fine to medium grained, indistinctly bedded at 0°-20°.	SW		a=0.66 d=0.44 a=4.33 d=2.35	63%		
					SANDSTONE: fine to medium grained, pale grey, indistinctly bedded at 0°-20°.						
		72			Borehole BH01 terminated at 25.40 m						
			26.0								
		71									
			27.0								
		70									
			28.0								
		69									
			29.0								
		68									
			30.0								
		67									
			31.0								
		66									

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method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- HA hand auger

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn
- RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CO contact
- CS crushed seam
- SM seam

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

coating
- CN clean
- SN stain
- VN veneer
- CO coating

PointID : BH01 Depth Range: 19.55 - 25.40 m

drawn	RH
approved	RH
date	04/04/2016
scale	N.T.S.
original size	A4

client: Dexus Projects Pty Ltd

project: Geotechnical & Contamination Investigation
12 Fredrick Street, St Leonards

title: **CORE PHOTOGRAPH**
BH01

project no: GEOTLCOV25513AB | fig no: **PHOTO 1** | rev:

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Engineering Log - Borehole

Borehole ID.	**BH02**
sheet:	1 of 2
project no.	**GEOTLCOV25513AB**
date started:	**17 Mar 2016**
date completed:	**17 Mar 2016**
logged by:	**KW**
checked by:	**AJH**

client: **Dexus Projects Pty Ltd**

principal:

project: **Geotechnical & Contamination Investigation**

location: **12 Fredrick Street, St Leonards**

position: Not Specified | surface elevation: 77.00 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm

drilling information | **material substance**

method & support	penetration (1 2 3)	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 CASING		Not Observed	E E	77				**CONCRETE**.				**CONCRETE**
								SAND: medium to coarse grained, pale brown.	M <Wp			**FILL** PID: 2.3 ppm No odour, staining observed PID: 3.1 ppm
								Sandy CLAY: low plasticity, dark grey, sand is fine to medium grained, with some fine to coarse, sub-angular to sub-rounded gravel, rock pieces, roots.				
				76	1.0			**SILTSTONE**: dark grey, slightly weathered, low to medium strength.				**WEATHERED BEDROCK**
								Borehole BH02 continued as cored hole				
				75	2.0							
				74	3.0							
				73	4.0							
				72	5.0							
				71	6.0							
				70	7.0							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix, e.g. AD/T
- B blank bit
- T TC bit
- V V bit

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/remouded (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 - Cored Borehole

Borehole ID.	**BH02**
sheet:	2 of 2
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **17 Mar 2016**
principal:	date completed: **17 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 77.00 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm | vane id.:

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description (ROCK TYPE: grain characterisics, colour, structure, minor components)	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		77			start coring at 0.70m						
NMLC	18/03/16, 12:20pm Not Observed	76	1.0		**INTERBEDDED SILTSTONE AND SANDSTONE**: pale grey and dark grey, siltstone is 50%, sandstone 50%, sandstone is fine to medium grained, indistinctly bedded at 0°-30°.	FR		a=5.12 d=5.50	51%		PT, 0 - 10°, PL, RO, CO PT, 0 - 10°, PL, SO - RO, Clay CO, rock fragments JT, 20 - 30°, PL, RO, CN PT, 10 - 20°, IR, RO, CN CS, 0 - 10°, IR, RO, SN, 110 mm, rock fragments
		75	2.0		**SANDSTONE**: pale grey and dark grey, fine to medium grained, distinctly bedded at 0°-20°, with dark grey laminations.			a=3.27 d=2.26	100%		
								a=2.70 d=1.35			
		74	3.0		2.80 m: becoming distinctly bedded at 10°-20° 3.10 m: becoming fine to coarse grained			a=1.54 d=1.25	90%		
		73	4.0								PT, 0 - 10°, PL, SO - RO, Clay CO, rock fragments
								a=1.67 d=1.68			
		72	5.0						100%		JT, 10 - 20°, PL, SO - RO, CN
		71	6.0					a=1.63 d=1.26	100%		JT, 10 - 20°, PL, SO - RO, CN
								a=1.51 d=1.25			
		70	7.0		Borehole BH02 terminated at 6.56 m						

Defects are: PT, 0 - 10°, PL, SO - RO, CN, unless otherwise described

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- HA hand auger

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn
- RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CO contact
- CS crushed seam
- SM seam

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

coating
- CN clean
- SN stain
- VN veneer
- CO coating

PointID : BH02 Depth Range: 0.70 - 6.56 m

drawn	RH
approved	RH
date	04/04/2016
scale	N.T.S.
original size	A4

client: Dexus Projects Pty Ltd

project: Geotechnical & Contamination Investigation
12 Fredrick Street, St Leonards

title: **CORE PHOTOGRAPH**
BH02

project no: GEOTLCOV25513AB | fig no: **PHOTO 2** | rev:

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Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	1 of 2
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **17 Mar 2016**
principal:	date completed: **17 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 77.00 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm

drilling information | **material substance**

method & support	penetration 1 2 3	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
HA / CASING / AD/T		Not Observed	E E SPT 25/50mm N*=R	77 76	1.0			**CONCRETE**. **FILL: SILTY SAND**: fine to coarse grained, brown, with some fine to coarse grained gravel, angular to sub-angluar, rock pieces. 0.5 m: becoming pale brown, pale orange	M			**CONCRETE** **FILL** PID: 4 ppm No odour, staining observed PID: 5.2 ppm PID: 5.6 ppm
								SANDSTONE: fine to medium grained, pale grey, dark grey, slightly weathered, low to medium strength. Borehole BH03 continued as cored hole				**WEATHERED BEDROCK**
				75	2.0							
				74	3.0							
				73	4.0							
				72	5.0							
				71	6.0							
				70	7.0							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

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/remouded (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 - Cored Borehole

Borehole ID.	**BH03**
sheet:	2 of 2
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **17 Mar 2016**
principal:	date completed: **17 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 77.00 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm | vane id.:

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		77									
		76	1.0		start coring at 1.20m						
NMLC	Not Observed 18/03/16	75	2.0		**SANDSTONE**: fine to medium grained, pale grey and dark grey, with dark grey laminations, distinctly bedded at 0°-20°.	FR		a=4.23 d=2.41	83%		PT, 0 - 10°, PL, SO - RO, SN PT, 0 - 10°, PL, SO - RO, SN PT, 0 - 10°, PL, SO - RO, SN PT, 0 - 10°, PL, SO - RO, SN - CO, rock fragments
								a=1.81 d=0.90			
		74	3.0		2.60 m: becoming distinctly bedded at 10°-20° 2.90 m: becoming fine to corase grained				93%		
		73	4.0					a=1.88 d=1.18			JT, 10 - 20°, PL, SO - RO, CN JT, 10 - 20°, PL, SO - RO, CN
		72	5.0					a=1.75 d=1.38	100%		
		71	6.0					a=1.99 d=1.39			PT, 0 - 10°, IR, RO, CN PT, 10 - 20°, PL, SO - RO, CN
									100%		
								a=1.88 d=1.29 a=2.89 d=1.38			
		70	7.0		Borehole BH03 terminated at 6.90 m						

Defects are: PT, 0 - 10°, PL, SO - RO, CN, unless otherwise described

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method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- HA hand auger

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn

RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CO contact
- CS crushed seam
- SM seam

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

coating
- CN clean
- SN stain
- VN veneer
- CO coating

PointID : BH03 Depth Range: 1.20 - 6.90 m

drawn	RH
approved	RH
date	04/04/2016
scale	N.T.S.
original size	A4

client: Dexus Projects Pty Ltd

project: Geotechnical & Contamination Investigation
12 Fredrick Street, St Leonards

title: **CORE PHOTOGRAPH**
BH03

project no: GEOTLCOV25513AB | fig no: **PHOTO 3** | rev:

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Engineering Log - Borehole

Borehole ID.	**BH04**
sheet:	1 of 2
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **18 Mar 2016**
principal:	date completed: **18 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter :

drilling information | **material substance**

method & support	penetration 1 2 3	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
HA			E					**FILL: Silty CLAY**: low plasticity, dark grey, with some gravel, fine to medium, angular to sub-angular, tree rootlets.	M <Wp			**TOPSOIL** PID: 7.5 ppm No odour, staining observed
			E	97				**FILL: Silty CLAY**: high plasticity, grey, dark red, pale grey, yellow-brown and dark grey mottling, with some gravel, fine to coarse grained, angular to sub-angular, tree rootlets. becoming pale grey with dark red and orange-brown mottling				**FILL** PID: 5.1 ppm No odour, staining observed PID: 7.3 ppm
			E		1.0							
				96					D			
					2.0							
				95								
AD/T		Not Observed	SPT 2, 13, 21 N*=34		3.0		CH	**Silty CLAY**: high plasticity, pale grey, with some gravel, fine to medium, angular to sub-angular, indistinct horizontal bedding.		VSt		**RESIDUAL SOIL** PID: 5.3 ppm
				94								
					4.0							
				93								
					5.0							
				92								
					6.0							
			SPT 4, 22, 38 N*=60					**SILTSTONE**: red-brown, highly weathered, low strength, distinct horizontal bedding. becoming pale red-brown with pale grey mottling stained rock fragments				**WEATHERED BEDROCK** PID: 7.2 ppm
				91								
					7.0							
				90								

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix e.g. AD/T
- B blank bit
- T TC bit
- V V bit

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/remouded (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.	**BH04**
sheet:	2 of 2
project no.	**GEOTLCOV25513AB**
date started:	**18 Mar 2016**
date completed:	**18 Mar 2016**
logged by:	**KW**
checked by:	**AJH**

client: **Dexus Projects Pty Ltd**

principal:

project: **Geotechnical & Contamination Investigation**

location: **12 Fredrick Street, St Leonards**

position: Not Specified | surface elevation: 97.50 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter :

drilling information						material substance						
method & support	penetration 1 2 3	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		Not Observed		89				**SILTSTONE**: red-brown, highly weathered, low strength, distinct horizontal bedding. *(continued)*	D			**WEATHERED BEDROCK**
			SPT 28/100mm, 12/mm HB N*=R		9.0			Borehole BH04 terminated at 9.10 m				
				88	10.0							
				87	11.0							
				86	12.0							
				85	13.0							
				84	14.0							
				83	15.0							
				82								

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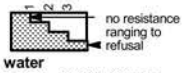
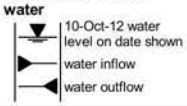
method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- HA hand auger

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

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/remouded (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.	**BH05**
sheet:	1 of 3
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **18 Mar 2016**
principal:	date completed: **18 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 77.00 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm

drilling information | **material substance**

method & support	penetration 1 2 3	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
CASING		Not Observed	E E	77				**CONCRETE**.				**CONCRETE**
								FILL: CLAYEY SAND: fine to coarse grained, dark grey, with some gravel, fine to coarse, angular to sub-angular, some rock pieces.	M			**FILL** PID: 6.3 ppm No odour staining observed PID: 7.2 ppm
								FILL: SILTY SAND: fine to coarse grained, pale brown, yellow-brown and pale grey, with some rock fragments.				
				76	1.0			Borehole BH05 continued as cored hole				
				75	2.0							
				74	3.0							
				73	4.0							
				72	5.0							
				71	6.0							
				70	7.0							

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method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
HA hand auger

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

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/remouded (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 - Cored Borehole

Borehole ID.	**BH05**
sheet:	2 of 3
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **18 Mar 2016**
principal:	date completed: **18 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 77.00 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm | vane id.:

drilling information | **material substance** | **rock mass defects**

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		77									
					start coring at 0.95m						
		76	1.0		**SILTSTONE**: dark grey, massive.	FR		a=6.64 d=4.17	67%		JT, 10 - 20°, PL, SO - RO, CN PT, 0 - 10°, IR, RO, CN
					INTERBEDDED SILTSTONE & SANDSTONE: dark grey, pale grey, siltstone 50%, sandstone 50%, sandstone is fine to medium grained, indistinctly bedded at 0°-30°.						
		75	2.0		**SANDSTONE**: fine to medium grained, pale grey, with dark grey laminations, distinctly bedded at 0°-10°.			a=2.99 d=2.45	75%		
		74	3.0		3.20 m: becoming distinctly bedded at 10°-20°						JT, 10 - 20°, PL, SO - RO, CN
	Not Observed										JT, 10 - 20°, PL, SO - RO, CN
		73	4.0		3.70 m: becoming fine to coarse grained			a=1.12 d=1.28	94%		JT, 10 - 20°, PL, SO - RO, CN
								a=1.63 d=1.47			JT, 10 - 20°, PL, SO - RO, CN JT, 10 - 20°, PL, SO - RO, CN JT, 20 - 30°, PL, SO - RO, CN
		72	5.0					a=1.30 d=1.83	100%		
		71	6.0					a=1.71 d=1.41			
		70	7.0						88%		JT, 10 - 20°, PL, SO - RO, CN
								a=1.69 d=1.56	87%		

Defects are: PT, 0 - 10°, PL, SO - RO, CN, unless otherwise described

CDF_0_9_06_LIBRARY.GLB rev:AM Log COF BOREHOLE: CORED GEOTLCOV25513AB.GPJ <<DrawingFile>> 04/04/2016 11:56

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- HA hand auger

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn
- RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CO contact
- CS crushed seam
- SM seam

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

coating
- CN clean
- SN stain
- VN veneer
- CO coating

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Engineering Log - Cored Borehole

Borehole ID.	**BH05**
sheet:	3 of 3
project no.	**GEOTLCOV25513AB**
client: **Dexus Projects Pty Ltd**	date started: **18 Mar 2016**
principal:	date completed: **18 Mar 2016**
project: **Geotechnical & Contamination Investigation**	logged by: **KW**
location: **12 Fredrick Street, St Leonards**	checked by: **AJH**

position: Not Specified | surface elevation: 77.00 m (AHD) | angle from horizontal: 90°

drill model: Geo Probe 6600, Truck mounted | drilling fluid: | hole diameter : 50 mm | vane id.:

drilling information				material substance					rock mass defects		
method & support	water	SRL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
	Not Observed				**SANDSTONE**: fine to medium grained, pale grey, with dark grey laminations, distinctly bedded at 0°-10°. *(continued)*	FR		a=1.94 d=1.59	87%		JT, 10 - 20°, PL, SO - RO, CN JT, 10 - 20°, PL, SO - RO, CN
		68	9.0		Borehole BH05 terminated at 8.90 m						
		67	10.0								
		66	11.0								
		65	12.0								
		64	13.0								
		63	14.0								
		62	15.0								

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- HA hand auger

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn

RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CO contact
- CS crushed seam
- SM seam

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

coating
- CN clean
- SN stain
- VN veneer
- CO coating

PointID : BH05 Depth Range: 0.95 - 8.90 m

drawn	RH
approved	RH
date	04/04/2016
scale	N.T.S.
original size	A4

client: Dexus Projects Pty Ltd

project: Geotechnical & Contamination Investigation
12 Fredrick Street, St Leonards

title: **CORE PHOTOGRAPH**
BH05

project no: GEOTLCOV25513AB | fig no: **PHOTO 4** | rev:

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Engineering Log - Environmental

Borehole No. **BH06**
Sheet 1 of 1
Office Job No.: **GEOTLCOV25513AB**

Client: ***Dexus Projects Pty. Ltd.***
Date started: ***29.3.2016***
Principal:
Date completed: ***29.3.2016***
Project: ***Geotechnical and Contamination Investigation***
Logged by: ***DW***
Borehole Location: ***12 Frederick Street, St Leonards***
Checked by: ***ML***

drill model and mounting: Geoprobe Vehicle | Easting: | slope: -90° | R.L. Surface:
hole diameter: 100 | Northing | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA				E, PID=2.7				SM	FILL: Silty SAND: Fine grained, brown with trace silt and fragments of sandstone and bricks.	D	L		Topsoil.
								SW	FILL: SAND: fine/medium grained, light brown.				Fill soils.
SS				E, PID=2.5				CL-ML	FILL: Silty CLAY: Low plasticity, grey with red mottling with trace fragments of shale.	M	F		
				E, PID=2.1		1							
								CL-ML	Becoming harder.	D	St		
						2			SILTSTONE: Extremely weathered silt, grey/red.		H		Weathered bedrock.
			Not encountered	E, PID=2.3									
				E, PID=20.6		3							
						4			Becoming slightly softer		MD		
				E, PID=126					Becoming hard		H		No odours detected.
									Becoming slightly softer		MD		
						5							
				E, PID=59.5							H		
									Becoming hard				
									SHALE: Moderately-slightly weathered, dark grey.				
						6							
									Borehole BH06 terminated at target depth				
						7							

method
AS auger screwing*
AD auger drilling*
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. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

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

ENVIRONMENTAL GEOTLCOV25513AB_ENVI.GPJ COFFEY.GDT 11.4.16

Form GEO 5.12 Issue 3 Rev.0

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Engineering Log - Environmental

Borehole No.	**BH07**
Sheet	1 of 1
Office Job No.:	**GEOTLCOV25513AB**
Client:	**Dexus Projects Pty. Ltd.**
Date started:	**29.3.2016**
Principal:	
Date completed:	**29.3.2016**
Project:	**Geotechnical and Contamination Investigation**
Logged by:	**DW**
Borehole Location:	**12 Frederick Street, St Leonards**
Checked by:	**ML**

drill model and mounting: Geoprobe Vehicle | Easting: | slope: -90° | R.L. Surface:
hole diameter: 100 | Northing | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA				E, PID=1.5				CL-ML	FILL: Silty CLAY: Low plasticity, brown with some fragments of sub-angular shale and pockets of clay.	D	L		Topsoil.
								CL-ML	FILL: Silty CLAY: Low plasticity, grey with red mottling with trace fragments of sub-angular siltstone.		F		
SS				E		1							
				E, PID=2.4				CL-ML	Silty CLAY: Low plasticity, grey with red mottling.		St		Residual soils.
								CL-ML	Fragments of sub-angular, yellow/orange/red siltstone.				
								CL-ML	Silty CLAY: Low plasticity, grey/red.				
				SPT 4,6,7 N*=13		2							
			Not encountered			3							
				E, PID=4.3									
				E, PID=3.8		4			SILTSTONE: Extremely to highly weathered siltstone, grey with some yellow/orange mottling.		D		Weathered bedrock.
						5			Becoming grey/red.		H		
				E, PID=4.0					Becoming dark grey.				
						6							
									Borehole BH07 terminated at target depth				
						7							

method
AS auger screwing*
AD auger drilling*
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. ADT

support
M mud N nil
C casing

penetration
1 2 3 4 — no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

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 - Environmental

Borehole No. **BH08**
Sheet 1 of 1
Office Job No.: **GEOTLCOV25513AB**

Client: ***Dexus Projects Pty Ltd***
Date started: ***29.3.2016***
Principal:
Date completed: ***29.3.2016***
Project: ***Geotechnical and Contamination Investigation***
Logged by: ***DW***
Borehole Location: ***12 Frederick Street, St Leonards***
Checked by: ***ML***

drill model and mounting: Geoprobe Vehicle | Easting: | slope: -90° | R.L. Surface:
hole diameter: 100 | Northing | bearing: | datum:

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA				E, PID=5.2				CLS ML	FILL: Sandy CLAY: Low plasticity, brown with fine grained sand.	D	L D		Topsoil fill.
									FILL: Clayey SILT: Low plasticity, grey with sub-rounded fragments of siltstone and shale.				
SS				E, PID=4.7				CL-ML	SILTSTONE: Highly weathered, grey with red mottling with red, sub-angular rock fragments.				Weathered bedrock.
				SPT 2,6,9 N*=15		1							
						2							
				SPT 5,29,NR N=R				CL-ML	Becoming harder.		H		
			Not encountered			3							
				E, PID=5.7				CL-ML	Becoming softer.		D		
						4							
				E, PID=28.5									
									SHALE: slightly weathered, grey, hard.		H		
						5							
				E, PID=11.5									
						6							
									Borehole BH08 terminated at target depth				
						7							

method
AS auger screwing*
AD auger drilling*
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. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

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

Appendix C - Equipment Calibration Records

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RENTALS

Equipment Report - MINIRAE 2000 PID

This Gas Meter has been performance checked and calibrated as follows:

Lamp	Compound	Concentration	Zero	Span	Traceability Lot #	Pass?
10.6 eV	Isobutylene	100 ppm	0.0 ppm	100 ppm	1808481 C2	☑

Alarm Limits

High	100 ppm
Low	50 ppm

Bump Test

Date	Target Gas	Reading	Pass?
24/03/2016	100 ppm	100 ppm	☑

☑ Battery Status 5.5V
☑ 10 minutes test complete
☑ Spare battery status (Min 5.5 volts)
☑ Electrical Safety Tag attached (AS/NZS 3760)

Tag No: 000507

Valid to: 24/06/2016

Date: 24/03/2016

Signed: [signature]

☑ Performance check (pump, lamp, sensor)
☐ Data cleared
☑ Filters checked

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	MiniRAE 2000 PID / Operational Check / Battery Status 5.5V
☑	☐	Lamp 10.6 eV, Compound Set to: ISOBUTYLENE CF factor: 1
☑	☐	Protective yellow rubber boot
☑	☐	Inlet probe (attached to PID)
☑	☐	Spare water trap filter(s) Qty 1
☑	☐	Charger 240V to 12V 500mA
☑	☐	Instruction Manual behind foam on the lid of case "
☑	☐	Quick Guide Sheet behind foam on the lid of case "
☑	☐	Spare Alkaline Battery Compartment with batteries
☑	☐	Inline Moisture trap Filter Guide Laminated
☒	☐	Calibration regulator & tubing (optional)
☒	☐	Data cable and Software CD (optional)
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 24/03/2016

Signed: [signature]

TFS Reference	CS004420	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	PIDMINSAF	Condition on return:	
Equipment Serial No.	110900781		

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Equipment Certification Report - Impact Pro Multi-Gas Detector

This Gas Meter has been performance checked/calibrated as follows:

- Fresh Air Calibration for all Sensors
- CH4 (combustibles)
- O2 00.0% volume check only within +/- 2%
- Charged
- 10 minute test complete
- Electrical Safety Tag attached (AS/NZS 3760)

- CO 100ppm Span
- 50% LEL (2.5%vol = 25,000ppm) Span
- H2S 40ppm Span n
- Spare Battery min 4.2v Volts

Tag no: 000444

Valid to: 11/05/2016

Calibration Gas traceability information available upon request

Date: 24/03/2016 Checked by: MILENKO

Signed: [signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
/			Impact Pro Gas Detector
/			Monitor / Performance check / Bat % 100%
/			Monitor setup for METHANE
/			Power supply 240/12v with base station
/			Flow adaptor [Grey] for calibration with hose
/			Pump adaptor [Black] with hose and Inline filter
/			Battery Cases with 4 Alkaline Batteries
/			Allen Key located back of Instrument to open battery
/			Spare inline filters _____
/			Instruction Manual behind foam on the lid of case
/			Quick Use Guide behind foam on the lid of case
/			Carry Case
			Regulator included: _____
			Cal Gas

Processors Signature/ Initials MS

Quote Reference	CS0004420	Condition on return
Customer Ref		
Equipment ID	IMPSO	
Equipment serial no.	ZEL1007672	
Return Date	/ /	
Return Time		

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Equipment Certification Report – TPS 90FLMV Water Quality Meter

This Water Quality Meter has been performance checked and calibrated as follows:

Sensor	Concentration	Span 1	Span 2	Traceability Lot #	Pass?
pH	pH 7.00 / pH 4.01	7.00 pH	4.00 pH	/	☑
Conductivity	12.88 mS/cm	0.00 mS/cm	12.88 mS/cm		☑
TDS	36 ppk	N/A ppk	N/A ppk	check only	☒
Dissolved Oxygen	Sodium Sulphite / Air	0.00 ppm in Sodium Sulphite	8.67 ppm Saturation in Air		☑

Check only

Redox (ORP) *	Electrode operability test	240mV +/- 10%	239 mV		☑

* This meter uses an Ag/AgCl ORP electrode. To convert readings to SHE (Standard Hydrogen Electrode), add 199mV to the mV reading.

☑ Battery Status 7.4 (min 7.2V)
☐ Electrical Safety Tag attached (AS/NZS 3760)

☑ Temperature 22.1 °C
☑ Electrodes Cleaned and checked

Tag No: 000419

Valid to: 01/05/2016

Date: 31/03/2016

Signed: [signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	90FLMV Unit. Ops check/Battery status: 8.00
☑	☐	pH sensor with wetting cap, 5m
☑	☐	Conductivity/TDS/Temperature K=10 sensor, 5m
☑	☐	Dissolved oxygen YSI5739 sensor with wetting cap, 5m
☑	☐	Redox (ORP) sensor with wetting cap, 5m
☑	☐	Power supply 240V to 12V DC 200mA
☑	☐	Instruction Manual
☑	☐	Quick Guide
☑	☐	Syringe with storage solution for pH and ORP sensors
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 31/03/2016

Signed: [signature]

TFS Reference	CS004465	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	90FLMV – 4	Condition on return:	
Equipment Serial No.	W4186		

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RENTALS

Equipment Report – Solinst Model 122 Interface Meter

This Meter has been performance checked / calibrated* as follows:

Cleaned/Tested **Pass?** ☑ **Yes** ☐ **No**

☑ Probe

☑ Tape/Reel

☑ Performance Test & Battery Voltage Check (8.7v) 8.0v minimum

Date: 31/03/2016 Checked by: MD

Signed: _____

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
☑	☐	☐	Operations check OK
☑	☐	☐	Plastic Box / Bag
☑	☐	☐	Spare 9V Battery Qty 1
☑	☐	☐	Probe Cleaning Brush
☑	☐	☐	Decon
☑	☐	☐	Instruction leaflet
☑	☐	☐	Tape Guide
☐	☐	☐	

Processors Signature/ Initials _____

Quote Reference	C5004465	Condition on return
Customer Ref		
Equipment ID	SOL122-43	
Equipment serial no.	250612	
Return Date	/ /	
Return Time		

Appendix D - Groundwater Sampling Records

coffey

Groundwater Sampling Form (A) - General

PROJECT NAME: _____ PROJECT NUMBER: Coffey 25513 AB

FIELD PERSONNEL: Jamaid Ray DATE: 01.04.2016

PROJECT MANAGER: Matthew Locke

WELL ID: BH2 METER ID& TYPE: WQM 90 FLMV W4486 TOTAL WELL DEPTH: _____ SCREEN INTERVAL: _____

EQUIPMENT USED: BAILER ☑ WATERRA ☐ OTHER _____ WELL DIAMETER: 50 WELL STICK-UP: _____

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

6.435 m - 1.055 = 5.4 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME: 19 L

WELL HEADSPACE PID READING

PID READING

PPM: _____

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or µS/cm)		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
845		1	1.31	3.00		924		7.28		54		21.9			✓				no colour or odd
9.10		19	5.36	2.10		1079		6.97		18		21.5			✓				"
		~~38~~		Dried at 26 L															
		48																	
		58																	
9:20		26	5.02	3.91		1052		7.08		9		21.5		✓					"
1030			2.105	4.44		1035		7.18		31		21.4			✓				N
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☑ DUPLICATE ID: _____ TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID: _____

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle) HAS THIS FORM BEEN COMPLETED IN FULL? Y ☑ N ☐

coffey

Groundwater Sampling Form (A) - General

PROJECT NAME: _____ PROJECT NUMBER: GEOTLCOU25513AB

FIELD PERSONNEL: J.R. DATE: 01.04.2016

PROJECT MANAGER: Matthew Locke

WELL ID: BH3. METER ID& TYPE: WQM 90FIMV W4486 TOTAL WELL DEPTH: 6.77 SCREEN INTERVAL: —

EQUIPMENT USED: BAILER ☑ WATERRA ☐ OTHER _____ WELL DIAMETER: 50. WELL STICK-UP: —

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

6.77 m - 1.398 = 5.25 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME: 18 L

WELL HEADSPACE PID READING

PID READING

PPM: —

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or µS/cm)		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
7~~00~~		1	1.010	~~1276~~ 2.23		1216		6.58		9.5		21.7		✓					no colour/odour.
		18	—	—															
		36			Purged	at		14	L										
		45																	
		54																	
0815		14	6.50	5.17		1092		7.2		74		20.9			✓				no colour/odour
10:00			1.545	4.14		976		7.06		23		22.4			✓				"
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☑ N ☐ DUPLICATE ID: BH3 – DUP TRIPLICATE COLLECTED: Y ☐ N ☑ TRIPLICATE ID: —

WERE METALS FIELD FILTERED? Y ☑ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle) HAS THIS FORM BEEN COMPLETED IN FULL? Y ☑ N ☐

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Well Gauging Form

PROJECT NAME: _____ PROJECT NUMBER: GEOTLCOV25513AB

FIELD PERSONNEL: Junaid Raz DATE: 1-4-2016

PROJECT MANAGER: Matthew Locke

FIELD EQUIPMENT:

Equipment Used: IP IP Serial Number: SOL122-43

REFER TO SOPs WHEN GAUGING WELLS:

SOP - Monitoring Well Gauging and SOP – Decontamination of Sampling Equipment

Time of Day	Well ID	Well Diameter	Total Well Depth note 1	Depth to PSH (NAPL) [A]	Depth to Groundwater [B]	PSH Thickness [B-A]	Height of Well Stick-Up	COMMENTS (notes 2 & 3) ODOUR, COLOUR, SHEEN, NAPL (and its colour), REMEDIATION SYSTEM, etc
		mm	m	mBTOC	mBTOC	mm	m	
0730	BH3	50	6.770		1.398			Clear - no colour or odour
0845	BH2	50	6.435		1.055			"

Appendix E - Laboratory Analytical Data: Summary Tables

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Table 1: Soil Analytical Results Compared to Health Investigation Levels
Stage 1 Site - 12 Frederick Street St Leonards

GEOTLCOV25513AB

	Field_ID	Health Assessment Criteria	Health Assessment Criteria	AH01_0.2-0.25	AH02_0.05-0.1	AH03_0.05-0.1	AH03_0.5-0.55	BH01_0.05-0.1	BH01_1.5-1.95	BH01_4.5-4.45	BH01_9.0-9.45	BH01_10.5-10.95	BH02_0.35-0.42	BH03_0.5-0.6	BH04_0.5-0.6	BH04_3.0-3.45	BH05_0.5	BH06_0.4	BH06_2.0	BH06_4.0	BH07_0.5	BH07_2.0	BH07_4.0	BH08_0.4	BH08_2.0	BH08_4.0	DUP 1	DUP1_A	DUP1
	Sampled_Date-Time	Sensitive Receptors	Construction Workers	16/03/2016	16/03/2016	16/03/2016	16/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	17/03/2016	17/03/2016	18/03/2016	18/03/2016	18/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	16/03/2016	16/03/2016
	Matrix_Type	(HIL B / HSL B)	(HIL D / HSL D)	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	RESIDUAL	FILL	FILL	BEDROCK	BEDROCK	FILL	RESIDUAL	BEDROCK	FILL	BEDROCK	BEDROCK			
Group	**ChemName**	**Units**	**LOR**																										
Moisture	Moisture Content	%	1																										
BTEX	Benzene	mg/kg	0.1	0.5	3	<0.1	<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	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1
	Ethylbenzene	mg/kg	0.1	55	27,000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
	Toluene	mg/kg	0.1	160	99,000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
	Total BTEX	mg/kg	0.2			-	-	-	-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	
	Xylene (m & p)	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<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	<0.5	<0.2
	Xylene (o)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
	Xylene Total	mg/kg	0.3	40	230	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3
TRH	TRH F1 (C6-C10 less BTEX)	mg/kg	10	45	260	<20	<20	<20	<20	<20	<20	<20	<10	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<10	<20
	TRH F2 C10-C16 less Naphthalene)	mg/kg	50	110	9000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	96	<50	<50	<50	<50	<50	<50	<50	<50	<50
	TRH F3 (C16-C34)	mg/kg	100	5800	27,000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	500
	TRH F4 (C34-C40)	mg/kg	100	8100	38,000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110
	C6 - C9	mg/kg	10			<20	<20	<20	<20	<20	<20	<20	<10	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<10	<20
	C10 - C14	mg/kg	20			<20	<20	<20	<20	<20	<20	<20	<50	<20	<20	<20	<20	<20	<20	<20	97	<20	<20	<20	<20	<20	<20	<50	<20
	C15 - C28	mg/kg	50			<50	<50	<50	<50	<50	<50	<50	<100	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<100	58
	C29 - C36	mg/kg	50			<50	<50	<50	<50	<50	<50	<50	<100	<50	<50	<50	<50	<50	<50	<50	97	<50	<50	<50	<50	<50	<50	<100	420
	C10 - C36 (Sum of total)	mg/kg	50			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	97	<50	<50	<50	<50	<50	<50	<50	480
	C10 - C40 (Sum of total)	mg/kg	50			-	-	-	-	-	-	-	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<50	-
	C10-C16	mg/kg	50			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	96	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	500
	C34-C40	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	110
	C6 - C10	mg/kg	10			<20	<20	<20	<20	<20	<20	<20	<10	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<10	<20
PAH	Acenaphthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
	B(a)P TEQ (lower)	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5
	B(a)P TEQ (medium)*	mg/kg	0.5			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.2	0.6
	B(a)P TEQ (upper)	mg/kg	0.5	4	40	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.2
	Benzo(g,h,i)perylene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
	Chrysene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
	Benzo[b+j]fluoranthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5
	Dibenz(a,h)anthracene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5
	Fluorene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5
	Total PAHs	mg/kg	0.5	400	4000	<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	<0.5	<0.5	<0.5	<0.5	<0.5	5.8	<0.5
Metals	Arsenic	mg/kg	2	500	3000	3.2	6.5	3.9	5.9	4.1	13	5.5	7	<2	6	<2	7.4	5.7	<2	-	-	-	-	-	-	-	-	-	10	11
	Cadmium	mg/kg	0.4	150	900	<0.4	<0.4	0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	-	-	-	-	-	-	-	<1	<0.4
	Chromium	mg/kg	2	50	3600	8.2	12	13	36	9	<5	24	40	<5	11	16	29	11	<5	-	-	-	-	-	-	-	-	-	10	10
	Copper	mg/kg	5	30,000	240,000	24	20	16	9.1	26	<5	<5	<5	<5	22	6.2	<5	<5	<5	-	-	-	-	-	-	-	-	-	26	40
	Lead	mg/kg	5	1200	1500	14	60	46	23	30	9.1	16	15	10	21	6.9	15	23	<5	<5	11	12	19	14	14	15	17	12	13	35	42
	Mercury	mg/kg	0.05	120	730	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.05
	Nickel	mg/kg	2	1200	6000	<5	6.4	6	6.9	6.6	<5	<5	<2	<5	14	6	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	6	6.4
	Zinc	mg/kg	5	60,000	400,000	22	110	49	15	86	<5	<5	<5	<5	68	8.9	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	83	110
OCP	4,4-DDE	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	a-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Aldrin	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Aldrin + Dieldrin	mg/kg	0.05	10	45	<0.1	<0.1	<0.1	-	-	-	-	-	-	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.1
	b-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Chlordane	mg/kg	0.05	90	530	<0.1	<0.1	<0.1	-	-	-	-	-	-	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.1
	cis-Chlordane	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	d-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	DDD	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	DDT	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.05
	DDT+DDE+DDD	mg/kg	0.05	600	3600	<0.15	<0.15	<0.15	-	-	-	-	-	-	<0.15	-	<0.15	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.15
	Dieldrin	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endosulfan	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Endosulfan I	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endosulfan II	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endosulfan sulphate	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endrin	mg/kg	0.05	20	100	<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endrin aldehyde	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endrin ketone	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	g-BHC (Lindane)	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Heptachlor	mg/kg	0.05	10	50	<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Heptachlor epoxide	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Hexachlorobenzene	mg/kg	0.05	15	80	<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Methoxychlor	mg/kg	0.2	500	2500	<0.2	<0.2	<0.2	-	-	-	-	-	-	<0.2	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2
	Toxaphene	mg/kg	1	30	160	<1	<1	<1	-	-	-	-	-	-	<1	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1
	trans-chlordane	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
OPP	Azinophos methyl	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Bromophos-ethyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Carbophenothion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Chlorfenvinphos	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Chlorpyrifos	mg/kg	0.05	340	2000	<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Coumaphos	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Demeton-S-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Diazinon	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Dichlorvos	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Dimethoate	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Disulfoton	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Ethion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Ethoprop	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Fenamiphos	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Fenitrothion	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Fensulfothion	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Fenthion	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Malathion	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Methyl parathion	mg/kg	0.2			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5
	Mevinphos (Phosdrin)	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Monocrotophos	mg/kg	0.2			<10	<10	<10	-	-	-	-	-	-	<10	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<10
	Parathion	mg/kg	0.2			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5
	Phorate	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Pirimphos-ethyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Prothiofos	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Ronnel	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Stirophos	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Trichloronate	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Pesticides	Demeton (total)	mg/kg	1			<1	<1	<1	-	-	-	-	-	-	<1	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1
	Profenofos	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
PCB	Aroclor 1016	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1232	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1242	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1248	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1254	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1260	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	PCBs (Sum of total)	mg/kg	0.1	1	7	<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.5

Table 2: Groundwater Analytical Results Compared to Groundwater Investigation Levels GEOTLCOV25513AB
Stage 1 Site - 12 Frederick Street St Leonards

			Field ID	BH02	BH03	BH03-DUP
			Sample Date	1-Apr-16	1-Apr-16	1-Apr-16
Group	Chemical	LOR (ug/L)	GIL (ug/L)			
BTEX	Benzene	1	1	<1	<1	<1
	Toluene	1	180	<1	<1	<1
	Ethylbenzene	1	80	<1	<1	<1
	m&p-Xylenes	2	75	<2	<2	<2
	o-Xylene	1	350	<1	<1	<1
	Xylenes - Total	3	600	<3	<3	<3
Heavy Metals	Arsenic (filtered)	10	10	10	3	3
	Cadmium (filtered)	0.1	0.2	<0.1	<0.1	<0.1
	Chromium (filtered)	1	1	<1	<1	<1
	Copper (filtered)	1	1.4	<1	<1	<1
	Lead (filtered)	1	3.4	<1	<1	<1
	Mercury (filtered)	0.1	0.6	<0.1	<0.1	<0.1
	Nickel (filtered)	11	11	11	6	6
	Zinc (filtered)	5	8	7	6	<5
PAH	Acenaphthene	1		<1	<1	<1
	Acenaphthylene	1		<1	<1	<1
	Anthracene	1	1	<1	<1	<1
	Benz(a)anthracene	1		<1	<1	<1
	Benzo(a)pyrene	1	1	<1	<1	<1
	Benzo(b&j)fluoranthene	1		<1	<1	<1
	Benzo(g.h.i)perylene	1		<1	<1	<1
	Benzo(k)fluoranthene	1		<1	<1	<1
	Chrysene	1		<1	<1	<1
	Dibenz(a.h)anthracene	1		<1	<1	<1
	Fluoranthene	1	1	<1	<1	<1
	Fluorene	1		<1	<1	<1
	Indeno(1.2.3-cd)pyrene	1		<1	<1	<1
	Naphthalene	1	16	<1	<1	<1
	Phenanthrene	1	1	<1	<1	<1
	Pyrene	1		<1	<1	<1
	Total PAH*	1		<1	<1	<1
TRH	TRH C6-C9	20	20	<20	<20	<20
	TRH C10-C14	50	50	<50	<50	<50
	TRH C15-C28	100	100	<100	<100	<100
	TRH C29-C36	100	100	<100	<100	<100
	TRH C10-36 (Total)	100		<100	<100	<100
	Naphthalene	10		<10	<10	<10
	TRH C6-C10	20		<20	<20	<20
	TRH C6-C10 less BTEX (F1)	20		<20	<20	<20
	TRH >C10-C16	50		<50	<50	<50
	TRH >C10-C16 less Naphthalene (F2)	50		<50	<50	<50
	TRH >C16-C34	100		<100	<100	<100
	TRH >C34-C40	100		<100	<100	<100
VOC	2-Propanone (Acetone)	1	LOR	10	<1	<1
	Other VOC	-		<LOR	<LOR	<LOR

coffey

Table 3: Soil Analytical Results Compared to Waste Classification Criteria
Stage 1 Site - 12 Frederick Street St Leonards

			Field_ID	NSW Waste Classification Guidelines (NSW EPA, Nov 2014)		AH01_0.2-0.25	AH02_0.05-0.1	AH03_0.05-0.1	AH03_0.5-0.55	BH01_0.05-0.1	BH01_1.5-1.95	BH01_4.5-4.45	BH01_9.0-9.45	BH01_10.5-10.95	BH02_0.35-0.42	BH03_0.5-0.6	BH04_0.5-0.6	BH04_3.0-3.45	BH05_0.5	BH06_0.4	BH06_2.0	BH06_4.0	BH07_0.5	BH07_2.0	BH07_4.0	BH08_0.4	BH08_2.0	BH08_4.0	DUP 1	DUP1_A	DUP1
			Sampled_Date-Time			16/03/2016	16/03/2016	16/03/2016	16/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	17/03/2016	17/03/2016	18/03/2016	18/03/2016	18/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	29/03/2016	16/03/2016	16/03/2016
			Matrix_Type			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	RESIDUAL	FILL	FILL	BEDROCK	BEDROCK	FILL	RESIDUAL	BEDROCK	FILL	BEDROCK	BEDROCK			
Chem_Group	ChemName	Units	LOR	CT1	CT2																										
Moisture	Moisture Content	%	1			12	23	20	13	16	11	18	17.9	15	9	6.2	15	16	7.8	5.8	9.4	12	17	16	12	7.1	12	12	14	18.3	16
BTEX	Benzene	mg/kg	0.1	10	40	<0.1	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1
	Ethylbenzene	mg/kg	0.1	600	2400	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
	Toluene	mg/kg	0.1	288	1152	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
	Total BTEX	mg/kg	0.2			-	-	-	-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-
	Xylene (m & p)	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<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	<0.5	<0.2
	Xylene (o)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1
	Xylene Total	mg/kg	0.3	1000	4000	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3
TRH	C6 - C9	mg/kg	10	650	2600	<20	<20	<20	<20	<20	<20	<20	<10	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<10	<20
	C10 - C36 (Sum of total)	mg/kg	50	10,000	40,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	97	<50	<50	<50	<50	<50	<50	<50	<50	480
PAH	Acenaphthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5	0.8	3.2	<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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5
	B(a)P TEQ (lower)	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5
	B(a)P TEQ (medium)*	mg/kg	0.5			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.2	0.6	0.6
	B(a)P TEQ (upper)	mg/kg	0.5			1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5
	Chrysene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5
	Benzo(b+j)fluoranthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5
	Fluorene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	<0.5
	Total PAHs	mg/kg	0.5	200	800	<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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.8	<0.5	<0.5
Metals	Arsenic	mg/kg	2	100	400	3.2	6.5	3.9	5.9	4.1	13	5.5	7	<2	6	<2	7.4	5.7	<2	-	-	-	-	-	-	-	-	-	-	10	11
	Cadmium	mg/kg	0.4	20	80	<0.4	<0.4	0.4	<0.4	<0.4	<0.4	<0.4	<1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	-	-	-	-	-	-	-	-	<1	<0.4
	Chromium	mg/kg	2	100	400	8.2	12	13	36	9	<5	24	40	<5	11	16	29	11	<5	-	-	-	-	-	-	-	-	-	-	10	10
	Copper	mg/kg	5			24	20	16	9.1	26	<5	<5	<5	<5	22	6.2	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	26	40
	Lead	mg/kg	5	100	400	14	60	46	23	30	9.1	16	15	10	21	6.9	15	23	<5	<5	11	12	19	14	14	15	17	12	13	35	42
	Mercury	mg/kg	0.05	4	16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	<0.1	<0.05
	Nickel	mg/kg	2	40	160	<5	6.4	6	6.9	6.6	<5	<5	<2	<5	14	6	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	6	6.4
	Zinc	mg/kg	5			22	110	49	15	86	<5	<5	<5	<5	68	8.9	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	83	110
OCP	4,4-DDE	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	a-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Aldrin	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Aldrin + Dieldrin	mg/kg	0.05			<0.1	<0.1	<0.1	-	-	-	-	-	-	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.1
	b-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Chlordane	mg/kg	0.05			<0.1	<0.1	<0.1	-	-	-	-	-	-	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.1
	cis-Chlordane	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	d-BHC	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	DDD	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	DDT	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.05
	DDT+DDE+DDD	mg/kg	0.05			<0.15	<0.15	<0.15	-	-	-	-	-	-	<0.15	-	<0.15	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.15
	Dieldrin	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endosulfan	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Endosulfan I	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endosulfan II	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endosulfan sulphate	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endosulfan (Sum)	mg/kg		60	240	<LOR	<LOR	<LOR							<LOR		<LOR													<LOR	<LOR
	Endrin	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endrin aldehyde	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Endrin ketone	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	g-BHC (Lindane)	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Heptachlor	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Heptachlor epoxide	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Hexachlorobenzene	mg/kg	0.05			<0.05	<0.05	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
	Methoxychlor	mg/kg	0.2			<0.2	<0.2	<0.2	-	-	-	-	-	-	<0.2	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2
	Toxaphene	mg/kg	1			<1	<1	<1	-	-	-	-	-	-	<1	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1
	trans-chlordane	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Scheduled Chemicals			50	50	<LOR	<LOR	<LOR							<LOR		<LOR													<LOR	<LOR
Pesticides	Azinophos methyl	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Bromophos-ethyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Carbophenothion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Chlorfenvinphos	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Chlorpyrifos	mg/kg	0.05	4	16	<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Coumaphos	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Demeton-S-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Diazinon	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Dichlorvos	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Dimethoate	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Disulfoton	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Ethion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Ethoprop	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Fenamiphos	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Fenitrothion	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Fensulfothion	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Fenthion	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Malathion	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Methyl parathion	mg/kg	0.2			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5
	Mevinphos (Phosdrin)	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Monocrotophos	mg/kg	0.2			<10	<10	<10	-	-	-	-	-	-	<10	-	<10	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<10
	Parathion	mg/kg	0.2			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.5
	Phorate	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Pirimphos-ethyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
	Prothiofos	mg/kg	0.05			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.5
	Ronnel	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Stirophos	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Trichloronate	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Demeton (total)	mg/kg	1			<1	<1	<1	-	-	-	-	-	-	<1	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1
	Profenofos	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Moderately Harmful Pesticides	mg/kg		250	1000	<LOR	<LOR	<LOR							<LOR		<LOR													<LOR	<LOR
Polychlorinated Bipl	Aroclor 1016	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1232	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1242	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1248	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1254	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	Aroclor 1260	mg/kg	0.5			<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
	PCBs (Sum of total)	mg/kg	0.1	50	50	<0.5	<0.5	<0.5	-	-	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.5

			Field_ID	AH01_0.2-0.25	DUP1		AH01_0.2-0.25	DUP1_A		BH08_0.4	DUP 1	
			Sampled_Date-Time	16/03/2016	16/03/2016	RPD %	16/03/2016	16/03/2016	RPD %	29/03/2016	29/03/2016	RPD%
			Matrix_Type	SOIL	SOIL		SOIL	SOIL		SOIL	SOIL	
Chem_Group	**ChemName**	**Units**	**EQL**									
Moisture	Moisture Content (dried @ 103°C)	%	1	12	16	29%	12	18.3	42%	7.1	14	65%
BTEX	Benzene	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.2	-	<0.1	<0.1	-
	Ethylbenzene	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.5	-	<0.1	<0.1	-
	Toluene	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.5	-	<0.1	<0.1	-
	Total BTEX	mg/kg	0.2	-	-	-	-	<0.2	-	-	-	-
	Xylene (m & p)	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.5	-	<0.2	<0.2	-
	Xylene (o)	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.5	-	<0.1	<0.1	-
	Xylene Total	mg/kg	0.3	<0.3	<0.3	-	<0.3	<0.5	-	<0.3	<0.3	-
	C6-C10 less BTEX (F1)	mg/kg	10	<20	<20	-	<20	<10	-	<20	<20	-
Metals	Arsenic	mg/kg	2	3.2	11	110%	3.2	10	103%	-	-	-
	Cadmium	mg/kg	0.4	<0.4	<0.4	-	<0.4	<1	-	-	-	-
	Chromium	mg/kg	2	8.2	10	20%	8.2	10	20%	-	-	-
	Copper	mg/kg	5	24	40	50%	24	26	8%	-	-	-
	Lead	mg/kg	5	14	42	100%	14	35	86%	15	13	14%
	Mercury	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.1	-	-	-	-
	Nickel	mg/kg	2	<5	6.4	-	<5	6	-	-	-	-
	Zinc	mg/kg	5	22	110	133%	22	83	116%	-	-	-
OCP	4,4-DDE	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	a-BHC	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Aldrin	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Aldrin + Dieldrin	mg/kg	0.05	<0.1	<0.1	-	<0.1	<0.05	-	-	-	-
	b-BHC	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Chlordane	mg/kg	0.05	<0.1	<0.1	-	<0.1	<0.05	-	-	-	-
	cis-Chlordane	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	d-BHC	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	DDD	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	DDT	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.2	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05	<0.15	<0.15	-	<0.15	<0.05	-	-	-	-
	Dieldrin	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Endosulfan	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Endosulfan I	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Endosulfan II	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Endosulfan sulphate	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Endrin	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Endrin aldehyde	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Endrin ketone	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Heptachlor	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Heptachlor epoxide	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Hexachlorobenzene	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-	-	-	-
	Methoxychlor	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-
	Toxaphene	mg/kg	1	<1	<1	-	<1	-	-	-	-	-
	trans-chlordane	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
OPP	Azinophos methyl	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Bromophos-ethyl	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Carbophenothion	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Chlorfenvinphos	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Chlorpyrifos	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Coumaphos	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Demeton-S-methyl	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Diazinon	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Dichlorvos	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Dimethoate	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Disulfoton	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Ethion	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Ethoprop	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Fenamiphos	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Fenitrothion	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Fensulfothion	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Fenthion	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Malathion	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Methyl parathion	mg/kg	0.2	<0.5	<0.5	-	<0.5	<0.2	-	-	-	-
	Mevinphos (Phosdrin)	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Monocrotophos	mg/kg	0.2	<10	<10	-	<10	<0.2	-	-	-	-
	Parathion	mg/kg	0.2	<0.5	<0.5	-	<0.5	<0.2	-	-	-	-
	Phorate	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Pirimphos-ethyl	mg/kg	0.05	-	-	-	-	<0.05	-	-	-	-
	Prothiofos	mg/kg	0.05	<0.5	<0.5	-	<0.5	<0.05	-	-	-	-
	Ronnel	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Stirophos	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Trichloronate	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	0.7	-
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	0.7	-
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	0.7	-
	Chrysene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	0.7	-
	Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	0.6	-
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	1.1	-
	Fluorene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Naphthalene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
	Pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	1.3	-
	Total PAHs	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	5.8	-
Pesticides	Demeton (total)	mg/kg	1	<1	<1	-	<1	-	-	-	-	-
	Profenofos	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
Polychlorinated Biphenyls	Aroclor 1016	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Aroclor 1232	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Aroclor 1242	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Aroclor 1248	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Aroclor 1254	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Aroclor 1260	mg/kg	0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	PCBs (Sum of total)	mg/kg	0.1	<0.5	<0.5	-	<0.5	<0.1	-	-	-	-
TPH	F2-NAPHTHALENE	mg/kg	50	<50	<50	-	<50	<50	-	<50	<50	-
	C6 - C9	mg/kg	10	<20	<20	-	<20	<10	-	<20	<20	-
	C10 - C14	mg/kg	20	<20	<20	-	<20	<50	-	<20	<20	-
	C15 - C28	mg/kg	50	<50	58	-	<50	<100	-	<50	<50	-
	C29 - C36	mg/kg	50	<50	420	-	<50	<100	-	<50	<50	-
	C10 - C36 (Sum of total)	mg/kg	50	<50	480	-	<50	<50	-	<50	<50	-
	C10 - C40 (Sum of total)	mg/kg	50	-	-	-	-	<50	-	-	-	-
	C10-C16	mg/kg	50	<50	<50	-	<50	<50	-	<50	<50	-
	C16-C34	mg/kg	100	<100	500	-	<100	<100	-	<100	<100	-
	C34-C40	mg/kg	100	<100	110	-	<100	<100	-	<100	<100	-
	C6 - C10	mg/kg	10	<20	<20	-	<20	<10	-	<20	<20	-

Table 5: Comparison of Primary Duplicate Groundwater Analytical Data
Stage 1 Site - 12 Frederick Street St Leonards

			BH03	BH03-DUP	RPD %
			1-Apr-16	1-Apr-16	
Chem_Group	Chemical	LOR (ug/L)			
BTEX	Benzene	1	<1	<1	-
	Toluene	1	<1	<1	-
	Ethylbenzene	1	<1	<1	-
	m&p-Xylenes	2	<2	<2	-
	o-Xylene	1	<1	<1	-
	Xylenes - Total	3	<3	<3	-
Heavy Metals	Arsenic (filtered)	10	3	3	0%
	Cadmium (filtered)	0.1	<0.1	<0.1	-
	Chromium (filtered)	1	<1	<1	-
	Copper (filtered)	1	<1	<1	-
	Lead (filtered)	1	<1	<1	-
	Mercury (filtered)	0.1	<0.1	<0.1	-
	Nickel (filtered)	11	6	6	0%
	Zinc (filtered)	5	6	<5	-
PAH	Acenaphthene	1	<1	<1	-
	Acenaphthylene	1	<1	<1	-
	Anthracene	1	<1	<1	-
	Benz(a)anthracene	1	<1	<1	-
	Benzo(a)pyrene	1	<1	<1	-
	Benzo(b&j)fluoranthene	1	<1	<1	-
	Benzo(g.h.i)perylene	1	<1	<1	-
	Benzo(k)fluoranthene	1	<1	<1	-
	Chrysene	1	<1	<1	-
	Dibenz(a.h)anthracene	1	<1	<1	-
	Fluoranthene	1	<1	<1	-
	Fluorene	1	<1	<1	-
	Indeno(1.2.3-cd)pyrene	1	<1	<1	-
	Naphthalene	1	<1	<1	-
	Phenanthrene	1	<1	<1	-
	Pyrene	1	<1	<1	-
	Total PAH*	1	<1	<1	-
TRH	TRH C6-C9	20	<20	<20	-
	TRH C10-C14	50	<50	<50	-
	TRH C15-C28	100	<100	<100	-
	TRH C29-C36	100	<100	<100	-
	TRH C10-36 (Total)	100	<100	<100	-
	Naphthalene	10	<10	<10	-
	TRH C6-C10	20	<20	<20	-
	TRH C6-C10 less BTEX (F1)	20	<20	<20	-
	TRH >C10-C16	50	<50	<50	-
	TRH >C10-C16 less Naphthalene (F2)	50	<50	<50	-
	TRH >C16-C34	100	<100	<100	-
	TRH >C34-C40	100	<100	<100	-
VOC	2-Propanone (Acetone)	1	<1	<1	-
	Other VOC	-	<LOR	<LOR	-

Appendix F - Chain of Custody Documentation & Laboratory Analytical Certificates

Reference No. _____

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
A TETRA TECH COMPANY

Consigning Office:	Chatswood				
Report Results to:	Matthew Locke	Mobile:	0427202493	Email:	Matthew.locke@coffey.com
Invoices to:		Phone:	0427202493	Email:	matthew.locke@coffey.com

Project No:	GEOTLCOV25513AB	Task No:	
Project Name:	12 Frederick Street	Laboratory:	Eurofins
Sampler's Name:	KW	Project Manager:	Raphael Hyde
Special Instructions:	COC issued for Batch 493308		

Lab No.	Sample ID	Sample Date	Time	Matrix *(Soil...etc)*	Container Type & Preservative*	T-A-T *(specify)*	Analysis Request Section: Suite B4 (PAH/TRH/BTEX)	Suite M8 (Metals 8)	Asbestos (presence/abse	VOC	Suite B15 (OCP/OPP/PCB	BTEX / TPH C6-9							NOTES
	BH01_0.05-0.1	15-Mar		soil	jar	std	X	x											
	BH01_0.5-0.95	15-Mar		soil	jar	std													
	BH01_1.5-1.95	15-Mar		soil	jar	std	X	X											
	BH01_3.0-3.45	15-Mar		soil	jar	std													
	BH01_4.5-4.45	15-Mar		soil	jar	std	X	X											
	BH01_6.0-6.45	15-Mar		soil	jar	std													
	BH01_7.5-7.45	15-Mar		soil	jar	std													
	BH01_9.0-9.45	15-Mar		soil	jar	std	X	X											
	BH01_10.5-10.95	15-Mar		soil	jar	std	X	X											
	BH01_13.5- 13.95	15-Mar		soil	jar	std													

RELINQUISHED BY			RECEIVED BY		
Name:	Date:	→	Name:	Date:	
Coffey Environments	Time:		Company:	Time:	
Name:	Date:	→	Name:	Date:	
Company:	Time:		Company:	Time:	

Sample Receipt Advice: (Lab Use Only)

All Samples Recieved in Good Condition ☐

All Documentation is in Proper Order ☐

Samples Received Properly Chilled ☐

Lab. Ref/Batch No.

***Container Type & Preservation Codes:** **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

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NATA # 1261
Site # 1254 & 14271

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Sample Receipt Advice

Company name:	**Coffey Geotechnics Pty Ltd Chatswood**
Contact name:	Matthew Locke
Project name:	12 FREDRICK STREET
Project ID:	GEOTLCOV25513AB
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Mar 18, 2016 3:30 PM
Eurofins | mgt reference:	**493095**

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 : 5.6 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

Sample BH01_9.0-9.45 forwarded to ALS

Contact notes

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

Charl Du Preez on Phone : +61 (2) 9900 8400 or by e.mail: charldupreez@eurofins.com.au

Results will be delivered electronically via e.mail to Matthew Locke - Matthew_Locke@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Geotechnics Pty Ltd Chatswood email address.

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Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Matthew Locke**

Report **493095-S**
Project name 12 FREDRICK STREET
Project ID GEOTLCOV25513AB
Received Date Mar 18, 2016

Client Sample ID			**BH01_0.05-0.1**	**BH01_1.5-1.95**	**BH01_4.5-4.45**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S16-Ma15010**	**S16-Ma15012**	**S16-Ma15014**
Date Sampled			**Mar 15, 2016**	**Mar 15, 2016**	**Mar 15, 2016**
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	87	74	71
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5

Client Sample ID			BH01_0.05-0.1	BH01_1.5-1.95	BH01_4.5-4.45
Sample Matrix			Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Ma15010	S16-Ma15012	S16-Ma15014
Date Sampled			Mar 15, 2016	Mar 15, 2016	Mar 15, 2016
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	85	80	84
p-Terphenyl-d14 (surr.)	1	%	94	94	90
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100
Heavy Metals					
Arsenic	2	mg/kg	4.1	13	5.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	9.0	< 5	24
Copper	5	mg/kg	26	< 5	< 5
Lead	5	mg/kg	30	9.1	16
Mercury	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	5	mg/kg	6.6	< 5	< 5
Zinc	5	mg/kg	86	< 5	< 5
% Moisture	1	%	16	11	18

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
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Mar 23, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 23, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 24, 2016	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Metals M8	Sydney	Mar 24, 2016	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Mar 18, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Mar 18, 2016 3:30 PM
Address:	Level 18, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	493095	**Due:**	Mar 29, 2016
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1002	**Contact Name:**	Matthew Locke
Project Name:	12 FREDRICK STREET				
Project ID:	GEOTLCOV25513AB				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					CANCELLED	HOLD	Metals M8	Moisture Set	Eurofins | mgt Suite B4
Laboratory where analysis is conducted									
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
External Laboratory									
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
BH01_0.05-0.1	Mar 15, 2016		Soil	S16-Ma15010			X	X	X
BH01_0.5-0.95	Mar 15, 2016		Soil	S16-Ma15011		X			
BH01_1.5-1.95	Mar 15, 2016		Soil	S16-Ma15012			X	X	X
BH01_3.0-3.45	Mar 15, 2016		Soil	S16-Ma15013		X			
BH01_4.5-4.45	Mar 15, 2016		Soil	S16-Ma15014			X	X	X
BH01_6.0-6.45	Mar 15, 2016		Soil	S16-Ma15015		X			
BH01_7.5-7.45	Mar 15, 2016		Soil	S16-Ma15016		X			
BH01_9.0-9.45	Mar 15, 2016		Soil	S16-Ma15017	X				
BH01_10.5-	Mar 15, 2016		Soil	S16-Ma15018		X			

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Murarrie QLD 4172
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Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Mar 18, 2016 3:30 PM
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		Phone:	+61 2 9406 1000	**Priority:**	5 Day
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Project Name:	12 FREDRICK STREET				
Project ID:	GEOTLCOV25513AB				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					CANCELLED	HOLD	Metals M8	Moisture Set	Eurofins | mgt Suite B4
Laboratory where analysis is conducted									
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
External Laboratory									
10.95									
BH01_13.5-13.95	Mar 15, 2016		Soil	S16-Ma15019		X			

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 (Eurofins | mgt uses NATA accredited in-house method LTM-GEN-7010)
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, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene 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 Aroclor 1260 in Matrix Spikes and LCS.
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 RPDs 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							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	80			70-130	Pass	
TRH C10-C14	%	94			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	98			70-130	Pass	
Toluene	%	96			70-130	Pass	
Ethylbenzene	%	94			70-130	Pass	
m&p-Xylenes	%	93			70-130	Pass	
o-Xylene	%	92			70-130	Pass	
Xylenes - Total	%	93			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	93			70-130	Pass	
TRH C6-C10	%	86			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	91			70-130	Pass	
Acenaphthylene	%	105			70-130	Pass	
Anthracene	%	95			70-130	Pass	
Benz(a)anthracene	%	77			70-130	Pass	
Benzo(a)pyrene	%	77			70-130	Pass	
Benzo(b&j)fluoranthene	%	75			70-130	Pass	
Benzo(g.h.i)perylene	%	106			70-130	Pass	
Benzo(k)fluoranthene	%	87			70-130	Pass	
Chrysene	%	94			70-130	Pass	
Dibenz(a.h)anthracene	%	104			70-130	Pass	
Fluoranthene	%	91			70-130	Pass	
Fluorene	%	90			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	109			70-130	Pass	
Naphthalene	%	98			70-130	Pass	
Phenanthrene	%	96			70-130	Pass	
Pyrene	%	90			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	92			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	93			70-130	Pass	
Cadmium	%	94			70-130	Pass	
Chromium	%	95			70-130	Pass	
Copper	%	95			70-130	Pass	
Lead	%	99			70-130	Pass	
Mercury	%	88			70-130	Pass	
Nickel	%	94			70-130	Pass	
Zinc	%	84			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S16-Ma22656	NCP	%	82			70-130	Pass	
TRH C10-C14	S16-Ma16424	NCP	%	98			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S16-Ma22656	NCP	%	102			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Toluene	S16-Ma22656	NCP	%	92			70-130	Pass	
Ethylbenzene	S16-Ma22656	NCP	%	109			70-130	Pass	
m&p-Xylenes	S16-Ma22656	NCP	%	126			70-130	Pass	
o-Xylene	S16-Ma22656	NCP	%	120			70-130	Pass	
Xylenes - Total	S16-Ma22656	NCP	%	124			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S16-Ma22656	NCP	%	107			70-130	Pass	
TRH C6-C10	S16-Ma22656	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S16-Ma16418	NCP	%	99			70-130	Pass	
Acenaphthylene	S16-Ma16418	NCP	%	103			70-130	Pass	
Anthracene	S16-Ma16418	NCP	%	102			70-130	Pass	
Benz(a)anthracene	S16-Ma16418	NCP	%	112			70-130	Pass	
Benzo(a)pyrene	S16-Ma16418	NCP	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	S16-Ma16418	NCP	%	91			70-130	Pass	
Benzo(g.h.i)perylene	S16-Ma16418	NCP	%	125			70-130	Pass	
Benzo(k)fluoranthene	S16-Ma16418	NCP	%	97			70-130	Pass	
Chrysene	S16-Ma16418	NCP	%	103			70-130	Pass	
Dibenz(a.h)anthracene	S16-Ma16418	NCP	%	117			70-130	Pass	
Fluoranthene	S16-Ma16418	NCP	%	114			70-130	Pass	
Fluorene	S16-Ma16418	NCP	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S16-Ma16418	NCP	%	118			70-130	Pass	
Naphthalene	S16-Ma16418	NCP	%	100			70-130	Pass	
Phenanthrene	S16-Ma16418	NCP	%	101			70-130	Pass	
Pyrene	S16-Ma16418	NCP	%	110			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S16-Ma16424	NCP	%	97			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S16-Ma15014	CP	%	94			70-130	Pass	
Cadmium	S16-Ma15014	CP	%	104			70-130	Pass	
Chromium	S16-Ma15014	CP	%	96			70-130	Pass	
Copper	S16-Ma15014	CP	%	103			70-130	Pass	
Lead	S16-Ma15014	CP	%	101			70-130	Pass	
Mercury	S16-Ma15014	CP	%	102			70-130	Pass	
Nickel	S16-Ma15014	CP	%	102			70-130	Pass	
Zinc	S16-Ma15014	CP	%	101			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S16-Ma22655	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S16-Ma24637	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S16-Ma24637	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S16-Ma24637	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S16-Ma22655	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S16-Ma22655	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S16-Ma22655	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S16-Ma22655	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S16-Ma24637	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S16-Ma24637	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S16-Ma24637	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S16-Ma15559	NCP	%	2.4	2.4	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S16-Ma15012	CP	mg/kg	13	3.3	120	30%	Fail	Q15
Cadmium	S16-Ma15012	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S16-Ma15012	CP	mg/kg	< 5	5.3	41	30%	Fail	Q15
Copper	S16-Ma15012	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S16-Ma15012	CP	mg/kg	9.1	10	12	30%	Pass	
Mercury	S16-Ma15012	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S16-Ma15012	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S16-Ma15012	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S16-Ma15014	CP	mg/kg	< 0.5	< 0.5	<1	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
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Charl Du Preez	Analytical Services Manager
Bob Symons	Senior Analyst-Inorganic (NSW)
Ivan Taylor	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Operations 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

Reference No. _____

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
TETRA TECH COMPANY

Consigning Office	Chatswood				
Report Results to:	Matthew Locke	Mobile:	0427202493	Email	Matthew.locke@coffey.com
Invoices to:		Phone:	0427202493	Email	matthew.locke@coffey.com

Project No:	GEOTLCOV25513AB	Task No:	
Project Name:	12 Frederick Street	Laboratory:	Eurofins
Sampler's Name:	KW	Project Manager:	Raphael Hyde
Special Instructions:	COC issued for Batch 493308		

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil ..etc)	Container Type & Preservative*	T-A-T (specify)	Suite B4 (PAH/TRH/BTEX)	Suite M8 (Metals 8)	Asbestos (presence/abse	VOC	Suite B15 (OCP/OPP/PCB	BTEX / TPH C6 9							NOTES
	BH01_15.0-15.45	16-Mar		soil	jar	std													
	BH01_16.5-16.95	16-Mar		soil	jar	std													
	BH01_18.0- 18.45	16-Mar		soil	jar	std													
	BH01_19.5- 19.55	16-Mar		soil	jar	std													
	AH01_0.05-0.1	16-Mar		soil	jar	std													
	AH01_0.2-0.25	16-Mar		soil	jar	std	X	X			X								
	DUP1	16-Mar		soil	jar	std	X	X			X								
	DUP1_A	16-Mar		soil	jar	std	X	X			X								Please send to ALS
	AH02_0.05-0.1	16-Mar		soil	jar	std	X	X			X								
	AH02_0.35-0.4	16-Mar		soil	jar	std													
	AH02_0.5-0.55	16-Mar		soil	jar	std	X	X											
	AH03_0.05-0.1	16-Mar		soil	jar	std	X	X			X								
	AH03_0.3-0.35	16-Mar		soil	jar	std													
	AH03_0.5-0.55	16-Mar		soil	jar	std	X	X											

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)	
Name:	Date: →	Name: Ellen Wu	Date: 18/03/16	All Samples Recieved in Good Condition	☑
Coffey Environments	Time:	Company: EFImgt.	Time: 1530	All Documentation is in Proper Order	☑
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled	☑
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.	493308

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

eurofins | mgt

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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Sample Receipt Advice

Company name:	**Coffey Geotechnics Pty Ltd Chatswood**
Contact name:	Matthew Locke
Project name:	12 FREDRICK STREET
Project ID:	GEOTLCOV25513AB
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Mar 18, 2016 3:30 PM
Eurofins | mgt reference:	**493308**

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 : 4.2 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

Sample DUP1_A forwarded to ALS

Contact notes

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

Charl Du Preez on Phone : +61 (2) 9900 8400 or by e.mail: charldupreez@eurofins.com.au

Results will be delivered electronically via e.mail to Matthew Locke - Matthew_Locke@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Geotechnics Pty Ltd Chatswood email address.

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

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.

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Attention: **Matthew Locke**

Report **493308-S**
Project name 12 FREDRICK STREET
Project ID GEOTLCOV25513AB
Received Date Mar 18, 2016

Client Sample ID			**AH01_0.2-0.25**	**DUP1**	**AH02_0.05-0.1**	**AH03_0.05-0.1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S16-Ma16418**	**S16-Ma16419**	**S16-Ma16421**	**S16-Ma16424**
Date Sampled			**Mar 16, 2016**	**Mar 16, 2016**	**Mar 16, 2016**	**Mar 16, 2016**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	58	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	420	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	480	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	76	72	73	70
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			AH01_0.2-0.25	DUP1	AH02_0.05-0.1	AH03_0.05-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Ma16418	S16-Ma16419	S16-Ma16421	S16-Ma16424
Date Sampled			Mar 16, 2016	Mar 16, 2016	Mar 16, 2016	Mar 16, 2016
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	78	81	87	91
p-Terphenyl-d14 (surr.)	1	%	87	94	97	97
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Dibutylchlorendate (surr.)	1	%	109	116	117	122
Tetrachloro-m-xylene (surr.)	1	%	89	98	100	105
Polychlorinated Biphenyls (PCB)						
Aroclor-1016	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1232	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1242	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1248	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1254	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1260	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PCB*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibutylchlorendate (surr.)	1	%	109	116	117	122
Organophosphorus Pesticides (OP)						
Chlorpyrifos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Coumaphos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Demeton (total)	1	mg/kg	< 1	< 1	< 1	< 1
Diazinon	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorvos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dimethoate	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Disulfoton	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Ethoprop	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fenitrothion	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			AH01_0.2-0.25	DUP1	AH02_0.05-0.1	AH03_0.05-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Ma16418	S16-Ma16419	S16-Ma16421	S16-Ma16424
Date Sampled			Mar 16, 2016	Mar 16, 2016	Mar 16, 2016	Mar 16, 2016
Test/Reference	LOR	Unit				
Organophosphorus Pesticides (OP)						
Fensulfothion	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fenthion	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Methyl azinphos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Malathion	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Methyl parathion	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Mevinphos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Monocrotophos	10	mg/kg	< 10	< 10	< 10	< 10
Parathion	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phorate	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Profenofos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Prothiofos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Ronnel	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Stirophos	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Trichloronate	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Triphenylphosphate (surr.)	1	%	113	119	119	125
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	500	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	110	< 100	< 100
Heavy Metals						
Arsenic	2	mg/kg	3.2	11	6.5	3.9
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	0.4
Chromium	5	mg/kg	8.2	10	12	13
Copper	5	mg/kg	24	40	20	16
Lead	5	mg/kg	14	42	60	46
Mercury	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	5	mg/kg	< 5	6.4	6.4	6.0
Zinc	5	mg/kg	22	110	110	49
% Moisture	1	%	12	16	23	20

Client Sample ID			AH03_0.5-0.55
Sample Matrix			Soil
Eurofins | mgt Sample No.			S16-Ma16426
Date Sampled			Mar 16, 2016
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	< 50
TRH C29-C36	50	mg/kg	< 50
TRH C10-36 (Total)	50	mg/kg	< 50
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1

Client Sample ID			AH03_0.5-0.55
Sample Matrix			Soil
Eurofins | mgt Sample No.			S16-Ma16426
Date Sampled			Mar 16, 2016
Test/Reference	LOR	Unit	
BTEX			
Xylenes - Total	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	75
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	90
p-Terphenyl-d14 (surr.)	1	%	95
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH >C10-C16	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
Heavy Metals			
Arsenic	2	mg/kg	5.9
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	36
Copper	5	mg/kg	9.1
Lead	5	mg/kg	23
Mercury	0.05	mg/kg	< 0.05
Nickel	5	mg/kg	6.9
Zinc	5	mg/kg	15
% Moisture	1	%	13

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
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Mar 23, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 23, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 24, 2016	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B15			
Organochlorine Pesticides	Sydney	Mar 24, 2016	14 Day
- Method: E013 Organochlorine Pesticides (OC)			
Polychlorinated Biphenyls (PCB)	Sydney	Mar 24, 2016	28 Day
- Method: E013 Polychlorinated Biphenyls (PCB)			
Organophosphorus Pesticides (OP)	Sydney	Mar 24, 2016	14 Day
- Method: E014 Organophosphorus Pesticides (OP)			
Metals M8	Sydney	Mar 24, 2016	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Mar 18, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Mar 18, 2016 3:30 PM
Address:	Level 18, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	493308	**Due:**	Mar 29, 2016
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1002	**Contact Name:**	Matthew Locke
Project Name:	12 FREDRICK STREET				
Project ID:	GEOTLCOV25513AB				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					CANCELLED	HOLD	Metals M8	Eurofins | mgt Suite B15	Moisture Set	Eurofins | mgt Suite B4
Laboratory where analysis is conducted										
Melbourne Laboratory - NATA Site # 1254 & 14271										
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794										
External Laboratory										
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
BH01_15.0-15.45	Mar 16, 2016		Soil	S16-Ma16413		X				
BH01_16.5-16.95	Mar 16, 2016		Soil	S16-Ma16414		X				
BH01_18.0-18.45	Mar 16, 2016		Soil	S16-Ma16415		X				
BH01_19.5-19.55	Mar 16, 2016		Soil	S16-Ma16416		X				
AH01_0.05-0.1	Mar 16, 2016		Soil	S16-Ma16417		X				
AH01_0.2-0.25	Mar 16, 2016		Soil	S16-Ma16418			X	X	X	X

eurofins | mgt

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Mar 18, 2016 3:30 PM
Address:	Level 18, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	493308	**Due:**	Mar 29, 2016
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Project Name:	12 FREDRICK STREET				
Project ID:	GEOTLCOV25513AB				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					CANCELLED	HOLD	Metals M8	Eurofins | mgt Suite B15	Moisture Set	Eurofins | mgt Suite B4
Laboratory where analysis is conducted										
Melbourne Laboratory - NATA Site # 1254 & 14271										
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794										
External Laboratory										
DUP1	Mar 16, 2016		Soil	S16-Ma16419			X	X	X	X
DUP1_A	Mar 16, 2016		Soil	S16-Ma16420	X					
AH02_0.05-0.1	Mar 16, 2016		Soil	S16-Ma16421			X	X	X	X
AH02_0.35-0.4	Mar 16, 2016		Soil	S16-Ma16422		X				
AH02_0.5-0.55	Mar 16, 2016		Soil	S16-Ma16423	X					
AH03_0.05-0.1	Mar 16, 2016		Soil	S16-Ma16424			X	X	X	X
AH03_0.3-0.35	Mar 16, 2016		Soil	S16-Ma16425		X				
AH03_0.5-0.55	Mar 16, 2016		Soil	S16-Ma16426			X		X	X

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 (Eurofins | mgt uses NATA accredited in-house method LTM-GEN-7010)
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, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene 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 Aroclor 1260 in Matrix Spikes and LCS.
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 RPDs 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							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Polychlorinated Biphenyls (PCB)							
Aroclor-1016	mg/kg	< 0.5			0.5	Pass	
Aroclor-1232	mg/kg	< 0.5			0.5	Pass	
Aroclor-1242	mg/kg	< 0.5			0.5	Pass	
Aroclor-1248	mg/kg	< 0.5			0.5	Pass	
Aroclor-1254	mg/kg	< 0.5			0.5	Pass	
Aroclor-1260	mg/kg	< 0.5			0.5	Pass	
Total PCB*	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	mg/kg	< 0.5			0.5	Pass	
Coumaphos	mg/kg	< 0.5			0.5	Pass	
Demeton (total)	mg/kg	< 1			1	Pass	
Diazinon	mg/kg	< 0.5			0.5	Pass	
Dichlorvos	mg/kg	< 0.5			0.5	Pass	
Dimethoate	mg/kg	< 0.5			0.5	Pass	
Disulfoton	mg/kg	< 0.5			0.5	Pass	
Ethoprop	mg/kg	< 0.5			0.5	Pass	
Fenitrothion	mg/kg	< 0.5			0.5	Pass	
Fensulfothion	mg/kg	< 0.5			0.5	Pass	
Fenthion	mg/kg	< 0.5			0.5	Pass	
Methyl azinphos	mg/kg	< 0.5			0.5	Pass	
Malathion	mg/kg	< 0.5			0.5	Pass	
Methyl parathion	mg/kg	< 0.5			0.5	Pass	
Mevinphos	mg/kg	< 0.5			0.5	Pass	
Monocrotophos	mg/kg	< 10			10	Pass	
Parathion	mg/kg	< 0.5			0.5	Pass	
Phorate	mg/kg	< 0.5			0.5	Pass	
Profenofos	mg/kg	< 0.5			0.5	Pass	
Prothiofos	mg/kg	< 0.5			0.5	Pass	
Ronnel	mg/kg	< 0.5			0.5	Pass	
Stirophos	mg/kg	< 0.5			0.5	Pass	
Trichloronate	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	90			70-130	Pass	
TRH C10-C14	%	94			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	98			70-130	Pass	
Toluene	%	98			70-130	Pass	
Ethylbenzene	%	97			70-130	Pass	
m&p-Xylenes	%	97			70-130	Pass	
o-Xylene	%	97			70-130	Pass	
Xylenes - Total	%	97			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	101			70-130	Pass	
TRH C6-C10	%	102			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	91			70-130	Pass	
Acenaphthylene	%	105			70-130	Pass	
Anthracene	%	95			70-130	Pass	
Benz(a)anthracene	%	77			70-130	Pass	
Benzo(a)pyrene	%	77			70-130	Pass	
Benzo(b&j)fluoranthene	%	75			70-130	Pass	
Benzo(g.h.i)perylene	%	106			70-130	Pass	
Benzo(k)fluoranthene	%	87			70-130	Pass	
Chrysene	%	94			70-130	Pass	
Dibenz(a.h)anthracene	%	104			70-130	Pass	
Fluoranthene	%	91			70-130	Pass	
Fluorene	%	90			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	109			70-130	Pass	
Naphthalene	%	98			70-130	Pass	
Phenanthrene	%	96			70-130	Pass	
Pyrene	%	90			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	129			70-130	Pass	
4.4'-DDD	%	130			70-130	Pass	
4.4'-DDE	%	129			70-130	Pass	
4.4'-DDT	%	128			70-130	Pass	
a-BHC	%	123			70-130	Pass	
Aldrin	%	129			70-130	Pass	
b-BHC	%	122			70-130	Pass	
d-BHC	%	123			70-130	Pass	
Dieldrin	%	129			70-130	Pass	
Endosulfan I	%	129			70-130	Pass	
Endosulfan II	%	126			70-130	Pass	
Endosulfan sulphate	%	128			70-130	Pass	
Endrin	%	125			70-130	Pass	
Endrin aldehyde	%	127			70-130	Pass	
Endrin ketone	%	123			70-130	Pass	
g-BHC (Lindane)	%	126			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heptachlor	%	121			70-130	Pass	
Heptachlor epoxide	%	129			70-130	Pass	
Hexachlorobenzene	%	117			70-130	Pass	
Methoxychlor	%	127			70-130	Pass	
Toxaphene	%	118			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls (PCB)							
Aroclor-1260	%	88			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	%	106			70-130	Pass	
Coumaphos	%	78			70-130	Pass	
Demeton (total)	%	109			70-130	Pass	
Diazinon	%	79			70-130	Pass	
Dichlorvos	%	89			70-130	Pass	
Dimethoate	%	102			70-130	Pass	
Disulfoton	%	97			70-130	Pass	
Fenitrothion	%	125			70-130	Pass	
Fenthion	%	118			70-130	Pass	
Methyl azinphos	%	76			70-130	Pass	
Malathion	%	101			70-130	Pass	
Methyl parathion	%	120			70-130	Pass	
Monocrotophos	%	95			70-130	Pass	
Phorate	%	71			70-130	Pass	
Ronnel	%	122			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	92			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	97			70-130	Pass	
Cadmium	%	104			70-130	Pass	
Chromium	%	100			70-130	Pass	
Copper	%	98			70-130	Pass	
Lead	%	106			70-130	Pass	
Mercury	%	97			70-130	Pass	
Nickel	%	99			70-130	Pass	
Zinc	%	102			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S16-Ma16418	CP	%	99			70-130	Pass	
Acenaphthylene	S16-Ma16418	CP	%	103			70-130	Pass	
Anthracene	S16-Ma16418	CP	%	102			70-130	Pass	
Benz(a)anthracene	S16-Ma16418	CP	%	112			70-130	Pass	
Benzo(a)pyrene	S16-Ma16418	CP	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	S16-Ma16418	CP	%	91			70-130	Pass	
Benzo(g.h.i)perylene	S16-Ma16418	CP	%	125			70-130	Pass	
Benzo(k)fluoranthene	S16-Ma16418	CP	%	97			70-130	Pass	
Chrysene	S16-Ma16418	CP	%	103			70-130	Pass	
Dibenz(a.h)anthracene	S16-Ma16418	CP	%	117			70-130	Pass	
Fluoranthene	S16-Ma16418	CP	%	114			70-130	Pass	
Fluorene	S16-Ma16418	CP	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S16-Ma16418	CP	%	118			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	S16-Ma16418	CP	%	100			70-130	Pass	
Phenanthrene	S16-Ma16418	CP	%	101			70-130	Pass	
Pyrene	S16-Ma16418	CP	%	110			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S16-Ma22643	NCP	%	129			70-130	Pass	
4.4'-DDD	S16-Ma22643	NCP	%	128			70-130	Pass	
4.4'-DDE	S16-Ma22643	NCP	%	130			70-130	Pass	
4.4'-DDT	S16-Ma22643	NCP	%	127			70-130	Pass	
a-BHC	S16-Ma22643	NCP	%	105			70-130	Pass	
Aldrin	S16-Ma22643	NCP	%	128			70-130	Pass	
b-BHC	S16-Ma22643	NCP	%	117			70-130	Pass	
d-BHC	S16-Ma22643	NCP	%	124			70-130	Pass	
Dieldrin	S16-Ma22643	NCP	%	129			70-130	Pass	
Endosulfan I	S16-Ma22643	NCP	%	130			70-130	Pass	
Endosulfan II	S16-Ma22643	NCP	%	125			70-130	Pass	
Endosulfan sulphate	S16-Ma22643	NCP	%	127			70-130	Pass	
Endrin	S16-Ma22643	NCP	%	115			70-130	Pass	
Endrin aldehyde	S16-Ma22643	NCP	%	116			70-130	Pass	
Endrin ketone	S16-Ma22643	NCP	%	106			70-130	Pass	
g-BHC (Lindane)	S16-Ma22643	NCP	%	112			70-130	Pass	
Heptachlor	S16-Ma22643	NCP	%	105			70-130	Pass	
Heptachlor epoxide	S16-Ma22643	NCP	%	126			70-130	Pass	
Hexachlorobenzene	S16-Ma22643	NCP	%	104			70-130	Pass	
Methoxychlor	S16-Ma22643	NCP	%	127			70-130	Pass	
Toxaphene	S16-Ma15457	NCP	%	121			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls (PCB)				Result 1					
Aroclor-1260	S16-Ma22644	NCP	%	83			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides (OP)				Result 1					
Chlorpyrifos	S16-Ma16418	CP	%	119			70-130	Pass	
Diazinon	S16-Ma16418	CP	%	87			70-130	Pass	
Dichlorvos	S16-Ma16418	CP	%	85			70-130	Pass	
Dimethoate	S16-Ma22659	NCP	%	88			70-130	Pass	
Disulfoton	S16-Ma16418	CP	%	89			70-130	Pass	
Fenitrothion	S16-Ma16418	CP	%	128			70-130	Pass	
Fenthion	S16-Ma16418	CP	%	129			70-130	Pass	
Methyl parathion	S16-Ma05109	NCP	%	111			70-130	Pass	
Monocrotophos	S16-Ma16534	NCP	%	70			70-130	Pass	
Phorate	S16-Ma16418	CP	%	87			70-130	Pass	
Ronnel	S16-Ma16418	CP	%	100			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S16-Ma15014	NCP	%	94			70-130	Pass	
Cadmium	S16-Ma15014	NCP	%	104			70-130	Pass	
Chromium	S16-Ma15014	NCP	%	96			70-130	Pass	
Copper	S16-Ma15014	NCP	%	103			70-130	Pass	
Lead	S16-Ma15014	NCP	%	101			70-130	Pass	
Mercury	S16-Ma15014	NCP	%	102			70-130	Pass	
Nickel	S16-Ma15014	NCP	%	102			70-130	Pass	
Zinc	S16-Ma15014	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C9	S16-Ma16424	CP	%	71			70-130	Pass	
TRH C10-C14	S16-Ma16424	CP	%	98			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S16-Ma16424	CP	%	85			70-130	Pass	
Toluene	S16-Ma16424	CP	%	82			70-130	Pass	
Ethylbenzene	S16-Ma16424	CP	%	76			70-130	Pass	
m&p-Xylenes	S16-Ma16424	CP	%	79			70-130	Pass	
o-Xylene	S16-Ma16424	CP	%	80			70-130	Pass	
Xylenes - Total	S16-Ma16424	CP	%	79			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S16-Ma16424	CP	%	86			70-130	Pass	
TRH C6-C10	S16-Ma16424	CP	%	71			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S16-Ma16424	CP	%	97			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S16-Ma17836	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S16-Ma24637	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S16-Ma24637	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S16-Ma24637	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S16-Ma17836	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S16-Ma17836	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S16-Ma17836	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S16-Ma17836	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S16-Ma17836	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S16-Ma17836	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S16-Ma17836	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S16-Ma17836	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S16-Ma15014	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S16-Ma17827	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S16-Ma17827	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S16-Ma17827	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Toxaphene	S16-Ma17827	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls (PCB)				Result 1	Result 2	RPD			
Aroclor-1016	S16-Ma16746	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1232	S16-Ma16746	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1242	S16-Ma16746	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1248	S16-Ma16746	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1254	S16-Ma16746	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1260	S16-Ma16746	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides (OP)				Result 1	Result 2	RPD			
Chlorpyrifos	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Coumaphos	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Demeton (total)	S16-Ma05108	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Diazinon	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorvos	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dimethoate	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Disulfoton	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethoprop	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenitrothion	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fensulfothion	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenthion	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl azinphos	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Malathion	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl parathion	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Mevinphos	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Monocrotophos	S16-Ma05108	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Parathion	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phorate	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Profenofos	S16-Ma22658	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Prothiofos	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ronnel	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Stirophos	S16-Ma22658	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloronate	S16-Ma05108	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S16-Ma24637	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S16-Ma24637	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S16-Ma24637	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S16-Ma15012	NCP	mg/kg	13	3.3	120	30%	Fail	Q15
Cadmium	S16-Ma15012	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S16-Ma15012	NCP	mg/kg	< 5	5.3	41	30%	Fail	Q15
Copper	S16-Ma15012	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S16-Ma15012	NCP	mg/kg	9.1	10	12	30%	Pass	
Mercury	S16-Ma15012	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S16-Ma15012	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S16-Ma15012	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S16-Ma16418	CP	%	12	11	14	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
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Charl Du Preez	Analytical Services Manager
Bob Symons	Senior Analyst-Inorganic (NSW)
Ivan Taylor	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Operations 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

Reference No. _____

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
A TETRA TECH COMPANY

Consigning Office	Chatswood				
Report Results to:	Matthew Locke	Mobile:	0427202493	Email:	Matthew.locke@coffey.com
Invoices to:		Phone:	0427202493	Email:	matthew.locke@coffey.com

Project No:	GEOTLCOV25513AB	Task No:	
Project Name:	12 Frederick Street	Laboratory:	Eurofins
Sampler's Name:	KW	Project Manager:	Raphael Hyde
Special Instructions:	COC issued for Batch 493355		

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Analysis Request Section: Suite B4 (PAH/TRH/BTEX)	Suite M8 (Metals 8)	Asbestos (presence/abse	VOC	Suite B15 (OCP/OPP/PCB	BTEX / TPH C6-9	NOTES
	BH02_0.14-0.2	17-Mar		Soil	jar	std							
	BH02_0.35-0.42	17-Mar		Soil	jar	std	X	X			X		
	BH03_0.25-0.35	17-Mar		Soil	jar	std							
	BH03_0.5-0.6	17-Mar		Soil	jar	std	X	X					
	BH03_1.0-1.05	17-Mar		Soil	jar	std	X	X					
	AUGAR RINSATE	17-Mar		water	jar	std	X	X					
	TRIP SPIKE	17-Mar		water	phial	std						X	
	TRIP BLANK	17-Mar		water	phial	std						X	

RELINQUISHED BY			RECEIVED BY		
Name:	Date:	→	Name: Ellen Wu	Date: 180316	
Coffey Environments	Time		Company: Eurofins	Time: 1530	
Name:	Date:	→	Name:	Date:	
Company:	Time:		Company:	Time:	

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☑
- All Documentation is in Proper Order ☑
- Samples Received Properly Chilled ☑
- Lab. Ref/Batch No. 493355

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

eurofins | mgt

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Murarrie QLD 4172
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NATA # 1261 Site # 20794

Sample Receipt Advice

Company name:	**Coffey Geotechnics Pty Ltd Chatswood**
Contact name:	Matthew Locke
Project name:	12 FREDRICK STREET
Project ID:	GEOTLCOV25513AB
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Mar 18, 2016 3:30 PM
Eurofins | mgt reference:	**493355**

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 : 15 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.

☑ Sample containers for volatile analysis received with zero headspace.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

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

Charl Du Preez on Phone : +61 (2) 9900 8400 or by e.mail: charldupreez@eurofins.com.au

Results will be delivered electronically via e.mail to Matthew Locke - Matthew_Locke@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Geotechnics Pty Ltd Chatswood email address.

eurofins | mgt

Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Matthew Locke**

Report **493355-S**
Project name 12 FREDRICK STREET
Project ID GEOTLCOV25513AB
Received Date Mar 18, 2016

Client Sample ID			**BH02_0.35-0.42**	**BH03_0.5-0.6**
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**S16-Ma16722**	**S16-Ma16724**
Date Sampled			**Mar 17, 2016**	**Mar 17, 2016**
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	74	72
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5

Client Sample ID			BH02_0.35-0.42	BH03_0.5-0.6
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S16-Ma16722	S16-Ma16724
Date Sampled			Mar 17, 2016	Mar 17, 2016
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Naphthalene	0.5	mg/kg	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	105	83
p-Terphenyl-d14 (surr.)	1	%	95	89
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 0.1	-
4.4'-DDD	0.05	mg/kg	< 0.05	-
4.4'-DDE	0.05	mg/kg	< 0.05	-
4.4'-DDT	0.05	mg/kg	< 0.05	-
a-BHC	0.05	mg/kg	< 0.05	-
Aldrin	0.05	mg/kg	< 0.05	-
b-BHC	0.05	mg/kg	< 0.05	-
d-BHC	0.05	mg/kg	< 0.05	-
Dieldrin	0.05	mg/kg	< 0.05	-
Endosulfan I	0.05	mg/kg	< 0.05	-
Endosulfan II	0.05	mg/kg	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-
Endrin	0.05	mg/kg	< 0.05	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-
Endrin ketone	0.05	mg/kg	< 0.05	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-
Heptachlor	0.05	mg/kg	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-
Methoxychlor	0.2	mg/kg	< 0.2	-
Toxaphene	1	mg/kg	< 1	-
Dibutylchlorendate (surr.)	1	%	101	-
Tetrachloro-m-xylene (surr.)	1	%	84	-
Polychlorinated Biphenyls (PCB)				
Aroclor-1016	0.5	mg/kg	< 0.5	-
Aroclor-1232	0.5	mg/kg	< 0.5	-
Aroclor-1242	0.5	mg/kg	< 0.5	-
Aroclor-1248	0.5	mg/kg	< 0.5	-
Aroclor-1254	0.5	mg/kg	< 0.5	-
Aroclor-1260	0.5	mg/kg	< 0.5	-
Total PCB*	0.5	mg/kg	< 0.5	-
Dibutylchlorendate (surr.)	1	%	101	-
Organophosphorus Pesticides (OP)				
Chlorpyrifos	0.5	mg/kg	< 0.5	-
Coumaphos	0.5	mg/kg	< 0.5	-
Demeton (total)	1	mg/kg	< 1	-
Diazinon	0.5	mg/kg	< 0.5	-
Dichlorvos	0.5	mg/kg	< 0.5	-
Dimethoate	0.5	mg/kg	< 0.5	-
Disulfoton	0.5	mg/kg	< 0.5	-
Ethoprop	0.5	mg/kg	< 0.5	-
Fenitrothion	0.5	mg/kg	< 0.5	-

Client Sample ID			BH02_0.35-0.42	BH03_0.5-0.6
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S16-Ma16722	S16-Ma16724
Date Sampled			Mar 17, 2016	Mar 17, 2016
Test/Reference	LOR	Unit		
Organophosphorus Pesticides (OP)				
Fensulfothion	0.5	mg/kg	< 0.5	-
Fenthion	0.5	mg/kg	< 0.5	-
Methyl azinphos	0.5	mg/kg	< 0.5	-
Malathion	0.5	mg/kg	< 0.5	-
Methyl parathion	0.5	mg/kg	< 0.5	-
Mevinphos	0.5	mg/kg	< 0.5	-
Monocrotophos	10	mg/kg	< 10	-
Parathion	0.5	mg/kg	< 0.5	-
Phorate	0.5	mg/kg	< 0.5	-
Profenofos	0.5	mg/kg	< 0.5	-
Prothiofos	0.5	mg/kg	< 0.5	-
Ronnel	0.5	mg/kg	< 0.5	-
Stirophos	0.5	mg/kg	< 0.5	-
Trichloronate	0.5	mg/kg	< 0.5	-
Triphenylphosphate (surr.)	1	%	81	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
Heavy Metals				
Arsenic	2	mg/kg	6.0	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	11	16
Copper	5	mg/kg	22	6.2
Lead	5	mg/kg	21	6.9
Mercury	0.05	mg/kg	< 0.05	0.10
Nickel	5	mg/kg	14	6.0
Zinc	5	mg/kg	68	8.9
% Moisture	1	%	9.0	6.2

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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Mar 23, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 23, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B4			
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 24, 2016	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B15			
Organochlorine Pesticides	Sydney	Mar 24, 2016	14 Day
- Method: E013 Organochlorine Pesticides (OC)			
Polychlorinated Biphenyls (PCB)	Sydney	Mar 24, 2016	28 Day
- Method: E013 Polychlorinated Biphenyls (PCB)			
Organophosphorus Pesticides (OP)	Sydney	Mar 24, 2016	14 Day
- Method: E014 Organophosphorus Pesticides (OP)			
Metals M8	Sydney	Mar 24, 2016	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Mar 18, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Mar 18, 2016 3:30 PM
Address:	Level 18, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	493355	**Due:**	Mar 29, 2016
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1002	**Contact Name:**	Matthew Locke
Project Name:	12 FREDRICK STREET				
Project ID:	GEOTLCOV25513AB				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					CANCELLED	HOLD	Metals M8	Eurofins | mgt Suite B15	Moisture Set	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted											
Melbourne Laboratory - NATA Site # 1254 & 14271											
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
External Laboratory											
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
BH02_0.14-0.2	Mar 17, 2016		Soil	S16-Ma16721		X					
BH02_0.35-0.42	Mar 17, 2016		Soil	S16-Ma16722			X	X	X	X	
BH03_0.25-0.35	Mar 17, 2016		Soil	S16-Ma16723		X					
BH03_0.5-0.6	Mar 17, 2016		Soil	S16-Ma16724			X		X	X	
BH03_1.0-1.05	Mar 17, 2016		Soil	S16-Ma16725	X						
AUGAR RINSATE	Mar 17, 2016		Water	S16-Ma16726			X			X	
TRIP SPIKE	Mar 17, 2016		Water	S16-Ma16727							X

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

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NATA # 1261 Site # 18217

Brisbane
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Murarrie QLD 4172
Phone : +61 7 3902 4600
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Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Mar 18, 2016 3:30 PM
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Project ID:	GEOTLCOV25513AB				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					CANCELLED	HOLD	Metals M8	Eurofins | mgt Suite B15	Moisture Set	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted											
Melbourne Laboratory - NATA Site # 1254 & 14271											
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
External Laboratory											
TRIP BLANK	Mar 17, 2016		Water	S16-Ma16728							X

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 (Eurofins | mgt uses NATA accredited in-house method LTM-GEN-7010)
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, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene 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 Aroclor 1260 in Matrix Spikes and LCS.
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 RPDs are calculated from raw analytical data thus it is possible to have two sets of data.