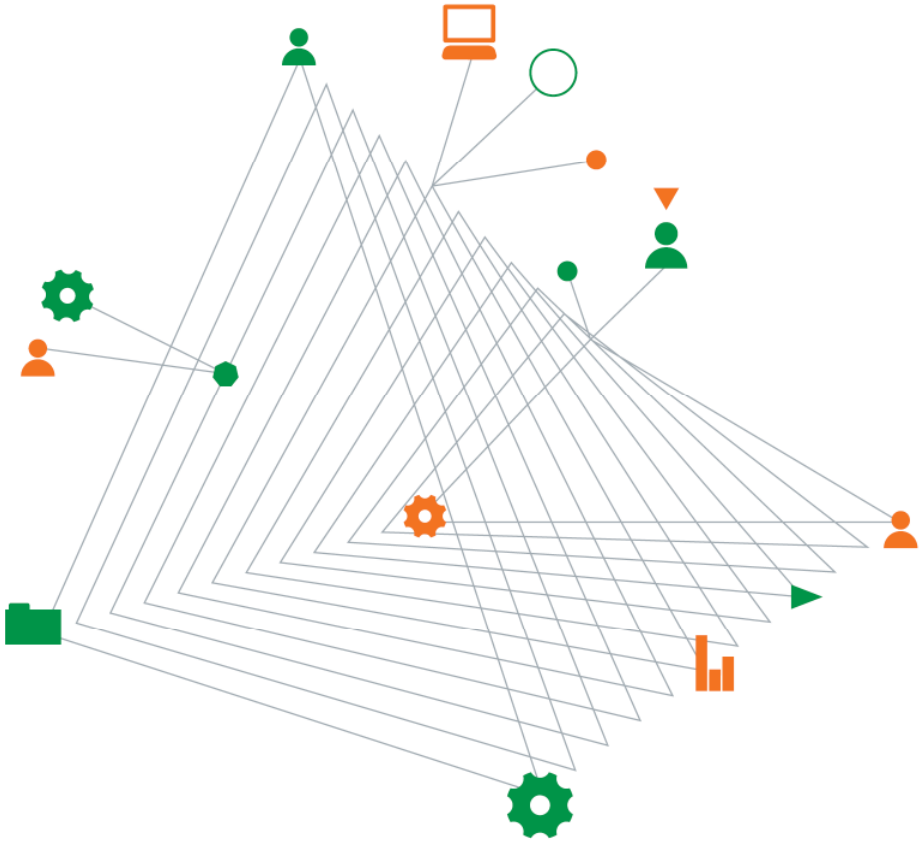
Johnstaff on Behalf of Health Infrastructure

Concord Hospital Redevelopment Project – Phase 1

Detailed Site Investigation



Experience comes to life when it is powered by expertise

This page has been left intentionally blank

Concord Hospital Redevelopment Project – Phase 1

Prepared for
Johnstaff on behalf of Health Infrastructure

Prepared by
Coffey Services Australia Pty Ltd
Level 19, Tower B, 799 Pacific Highway
Chatswood NSW 2067 Australia
t: +61 2 9406 1000 f:
ABN: 55 139 460 521

Project Reference: SYDGE253211-AF

Quality information

Revision history

Revision	Description	Date	Author	Reviewer
Rev 0	Original Issue	25/01/2018	S. Hay	M. Locke

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Rev 0	1	PDF	Marc Carneiro - Johnstaff	25/01/2018

Executive Summary

Johnstaff Projects Pty Ltd (Johnstaff) engaged Coffey Services Australia Pty Ltd (Coffey) on behalf of Health Infrastructure NSW to undertake a Detailed Site Investigation (DSI) at Concord Hospital, located at 1H Hospital Road, Concord West NSW (the site) to support future Development Application. The redevelopment works are located in three different areas of the site that were designated as Phases 1, 2 and 3:

This investigation was undertaken to facilitate Phase 1 which involves demolition of the existing structures and construction of a new multi storey building with one basement level.

Douglas Partners (DP) previously undertook a Preliminary Site Investigation (PSI) in 2016 which included a targeted investigation at the site. The PSI identified the potential for an underground storage tank (UST) to be present in the loading dock area situated within the investigation area. The PSI concluded the site was suitable for the proposed development subject to the following recommendations:

- Identify the content and capacity of the UST in the loading dock area;
- Carry out supplementary investigations in proximity to the identified UST; and
- Prepare a supplementary contamination report on the soil condition in the vicinity of the UST and provide advice on removal of the UST(s) if required.

This DSI was undertaken to address the data gaps identified in the 2016 DP PSI.

The objectives of this DSI were:

- To assess whether a UST may be present in the investigation area and to provide an indication of whether contamination may be present in soil or groundwater as a result of leaks from the suspected UST.
- Review readily available information in relation to the investigation area to identify other potential areas of environmental concern (AEC),
- Assess human health and environmental risks associated with potential contamination sources identified within the investigation area.
- Provide an opinion on whether the investigation area is suitable for the proposed development as per State Environment Planning Policy No. 55 – Remediation of Land (SEPP 55).
- Outline recommendations for further investigations and/or management measures in relation to contamination encountered.

Based on the review of the Douglas Partners PSI and the preliminary site walkover, the data gaps were considered to include the following:

- Presence of a suspected UST within the investigation area;
- Fill material of unknown origin or quality; and
- Presence of an interceptor trap within the investigation area.

Concentrations of contaminants of potential concern (CoPC) in soil samples analysed during this investigation were less than the adopted criteria. Asbestos was not detected at the reporting limit of 0.1 g/kg in the soil sample analysed. Review of the DP 2016 PSI indicated that no intrusive sampling was undertaken within the investigation area.

Concentrations of CoPC within groundwater were generally less than the laboratory LOR and adopted groundwater assessment criteria, with the exception of the following:

- Concentrations of copper within sample BH102 were detected at concentrations which exceeded the adopted Groundwater Investigation Levels (GIL) for marine waters; and
- Concentrations of zinc within samples BH102 were detected at concentrations which exceeded the adopted GIL for marine waters.

While fill was identified within the investigation area, concentrations of CoPC in samples analysed were less than the adopted health criteria.

Concentrations of copper, nickel and zinc were noted within groundwater sample BH102, collected from within the investigation area, however these concentrations were consistent with groundwater samples collected from the Phase 2 and Phase 3 investigation areas. It is considered that these concentrations of heavy metals were likely indicative of background levels present within the surrounding urban environment rather than point sources within the investigation area.

In completing this investigation Coffey determined it was unlikely that a UST was present within the investigation based on the following lines of evidence:

- Service utility drawings did not identify the presence of a UST;
- Anecdotal discussions with hospital maintenance staff indicated that a UST was unlikely to be present and that the service utility pit covers relate to either stormwater or sewer utilities;
- The GPR survey did not identify interference consistent with a metal vessel or void that extended laterally beyond the extent of the utility pit cover;
- The site walkover did not identify infrastructure such vents, fill point or bowsers;
- The surface features of the suspected UST service lid were visually consistent with the features of an utility pit covers or interceptor trap (IT);

The investigation identified that while an IT may be present within the investigation area, it is unlikely to have leaked as soil and groundwater analytical results from samples collected from the investigation area indicated that concentrations of CoPC associated with an IT were less than the adopted criteria.

The 2016 PSI undertaken by Douglas Partners concluded that the Phase 1 development area was suitable for the proposed development subject to further investigation regarding a suspected UST. In addition to the suspected UST, Coffey identified additional data gaps including fill of an unknown origin or quality, and the presence of an interceptor trap within the investigation area.

In completing the investigation, Coffey determined the following:

- Fill is present within the investigation however is unlikely to pose a health risk;
- Evidence obtained during the investigation including documentation review, discussions with hospital maintenance staff, GPR survey and site inspection indicated that a UST is unlikely to be present in the loading dock area;
- Observations made of the suspected UST location indicate it is likely to be an interceptor trap. Further investigation may be required to confirm this, and consideration should be given to the IT's presence during excavation and redevelopment works.

In completing this assessment Coffey concludes that the investigation area is suitable for the proposed development.

Table of Contents

Figures

Appendices

Abbreviations

µg/L	micrograms per litre
ACM	Asbestos Containing Materials
AEC	Area of Environmental Concern
ANZECC	Australian and New Zealand Environment Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
COPC	Chemicals of Potential Concern
CSM	Conceptual Site Model
DBYD	Dial Before You Dig
DO	Dissolved Oxygen
DP	Deposited Plan
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EC	Electrical Conductivity
EIL	Ecological investigation level
EPA	Environmental Protection Authority of NSW
ESL	Ecological screening level
GIL	Groundwater Investigation Level
Ha	Hectare
HIL	Health Investigation Level
HSL	Health Screening Level
IP	Interface Probe
LOR	Limit of Reporting

Abbreviations

mbgl	Metres below ground level
mbtoc	Metres Below Top of Casing
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
mm	Millimetre
mS/cm	Micro-Sieverts per centimetre
NAPL	Non-Aqueous Phase Liquids
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure as revised 2013
OCP	Organochlorine Pesticides
OEH	Office of Environment & Heritage of NSW
OPP	Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PID	Photo-ionisation Detector
ppm	Parts per million
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
TCLP	Toxicity Characteristic Leaching Procedure
TRH	Total Recoverable Hydrocarbons
UST	Underground Storage Tank

Abbreviations

UPSS	Underground Petroleum Storage System
VOC	Volatile Organic Compounds

1. Introduction

Johnstaff Projects Pty Ltd (Johnstaff) engaged Coffey Services Australia Pty Ltd (Coffey) on behalf of Health Infrastructure NSW to undertake a Detailed Site Investigation (DSI) at Concord Hospital, located at 1H Hospital Road, Concord West NSW (the site) to support future Development Application. The redevelopment works are located in three different areas of the site that were designated as Phases 1, 2 and 3:

- Phase 1 involves demolition of the existing structures and construction of a new multi storey building with one basement level, located in the red zone in Plate 1. The basement will comprise a loading dock constructed to RL4.0mAHD, and ground floor used as an atrium providing access to upper floors.
- Phase 2 covers two areas located in the blue zones in Plate 1. Details of these proposed developments are not yet confirmed.
- Phase 3 is a proposed multi storey carpark located between Hospital Road and Bray's Bay (purple zone in Plate 1). This area is currently an at-grade carpark.

Plate 1- Concord Hospital Phasing Plan

This report relates to the Phase 1 development area. The location and approximate boundaries of the investigation area are shown on Figures 1 and 2, respectively.

2. Background

The objective of the hospital redevelopment is to improve and replace outmoded facilities to meet the substantial growth in clinical service demand from across the hospital's catchment that has occurred and will continue to occur over the next ten years. The Phase 1 development will provide new Aged, Chronic Care and Rehabilitation facilities replacing the 70-year-old Ramp Wards. Phase 1 of the redevelopment is to include the demolition of the existing structures and construction of a new multi-storey building.

Douglas Partners (DP) previously undertook a Preliminary Site Investigation (PSI) in 2016 (Ref: 85326.01.R.001.Rev1, 10th June 2016) (DP 2016), which included targeted investigation at the site. The PSI identified the potential for an underground storage tank (UST) to be present in the loading dock area within the investigation area. The PSI concluded the site was suitable for the proposed development subject to the following recommendations:

- Identify the content and capacity of the UST in the loading dock area;
- Carry out supplementary investigations in proximity to the identified UST; and
- Prepare a supplementary contamination report on the soil condition in the vicinity of the UST and provide advice on removal of the UST(s) if required.

A summary of the findings of the PSI undertaken by DP is provided in Section 8.1 of this report.

3. Objectives

The objectives of this DSI were:

- To assess whether a UST may be present in the investigation area and to provide an indication of whether contamination may be present in soil or groundwater as a result of leaks from the suspected UST.
- Review readily available information in relation to the investigation area to identify other potential areas of environmental concern (AEC),
- Assess human health and environmental risks associated with potential contamination sources identified within the investigation area.
- Provide an opinion on whether the investigation area is suitable for the proposed development as per State Environment Planning Policy No. 55 – Remediation of Land (SEPP 55).
- Outline recommendations for further investigations and/or management measures in relation to contamination encountered.

4. Scope of Works

Coffey undertook the following scope of works to complete the DSI:

- Review of subsurface utility service drawings of the investigation area and previous environmental reports;
- Conduct a visual inspection of the investigation area;
- Conduct a Ground Penetrating Radar (GPR) survey to assess the location and orientation of the suspected UST;
- Progress two boreholes in the area surrounding the UST to a minimum depth of 6.0 metres below ground level (mBGL);
- Conversion of two boreholes into groundwater monitoring wells;
- Conduct a groundwater monitoring event (GME) comprising gauging, purging and sampling of groundwater from the installed groundwater wells;
- Laboratory analysis of primary soil samples, and groundwater samples at a National Association of Testing Authorities (NATA) accredited laboratory for contaminants of potential concern (CoPC); and
- Interpretation of investigation findings and laboratory data and preparation of this DSI report.

5. Technical Framework

Works were undertaken in general accordance with the following:

- NSW Work Health and Safety Act 2011 (WHS Act 2011);
- NSW Work Health and Safety Regulation 2011 (WHS Regulation 2016);
- Contaminated Land Management (CLM) Act, 1997 (CLM Act 1997);
- Contaminated Land Management Amendment Act 2008;
- Protection of the Environment Operations (POEO) Act 1997 (POEO Act 1997);
- NSW Environmental Protection Agency (EPA) POEO UPSS Regulation 2014 (UPSS Regulation 2014);
- National Environment Protection Council (NEPC) Act 1994 (NEPC Act 1994);
- NEPC, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (April 2013) (NEPM 2013);
- Department of Environment, Climate Change and Water NSW (DECCW), Guidelines for implementing the UPSS Regulation (2008), (DECCW 2009);
- Department of Environment and Conservation (DEC) NSW, Guidelines for the Assessment and Management of Groundwater Contamination, 2007 (DEC 2007);
- CRC Care Technical Report No. 10, Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, 2011 (CRCCARE 2011);
- NSW Office of Environment and Heritage (OEH), Guidelines for Consultants Reporting on Contaminated Sites, 2011 (OEH 2011);
- Australian Standard (AS) 4482.1, Guide to Investigation and Sampling of Sites with Potentially Contaminated Soil, Part 1: Non-volatile and Semi-volatile Compounds, 2005;
- AS 4482.2, Guide to the Sampling and Investigation of Potentially Contaminated Soil, Part 2: Volatile Substances, 1999; and
- AS 1726 Geotechnical Site Investigations, 2017.

6. Data Quality Objectives

Systematic planning and verification was undertaken to assess whether the data collected was reliable and representative of ground conditions within the investigation area. A process for establishing data quality objectives (DQOs) for an investigation has been defined by the United States Environmental Protection Agency (US EPA). That process has been adopted in AS 4482.1-2005 and referenced in NEPM 2013.

The DQO process is a seven-step iterative planning approach used to plan for environmental data collection activities. It provides a systematic approach for defining the criteria that a data collection design should satisfy, including when, where and how to collect samples or measurements, determination of tolerable decision error rates and the number of samples or measurements that should be collected.

The seven-step process for this investigation and data quality indicators adopted are discussed and summarised in Appendix A.

7. Investigation Area

7.1. Location and Identification Details

The investigation area is situated within the south western portion of Concord Hospital grounds. Details describing the investigation area are summarised in Table 7.1.

Table 7.1: Identification Details – Investigation Area

Address	1H Hospital Road, Concord West, NSW
Area	The investigation area was approximately 550m^2 in size.
Title Identification Details	Lot 2, DP535257, Lot 1, DP455866, Lots 21 & 22, DP1139098
Current Zoning	SP2 – Infrastructure: Hospital (Under the Canada Bay Local Environmental Plan (LEP) 2013).
Current Use	The investigation area operated as a loading dock for the Multi Building.
Adjoining Site Uses	**North:** Thomas Walker Hospital and Brays Bay beyond. **South:** Dame Edith Walker Hospital, tennis courts and Yaralla Bay beyond. **East:** Concord Repatriation General Hospital, and Yaralla Bay beyond. **West:** Residential properties, Concord Road.

7.1.1. Description of the Investigation Area

An experienced environmental scientist from Coffey conducted a walkover of the investigation area on 1st December 2017. At this time, the investigation area comprised a hard-paved loading dock situated north-west of Building 63 and on the western side of the Multi-Building. The investigation area sloped from the north-west to the south-east towards Yaralla Bay. Curb and guttering was present to divert runoff towards stormwater drainage system.

Multiple garbage bins were stored along the perimeter of the loading dock and multiple pressurised gas cylinders were stored in a locked caged on the western side. Numerous below ground utility pits were noted in multiple locations of the loading dock driveway with multiple concrete cuts, which appeared to be associated with the utility pits. During the inspection, the Coffey scientist did not identify above ground infrastructure typically associated with underground petroleum storage systems (UPSS) such as fuel bowsers or vent pipes. Small, circular covers were present on two of the utility pit lids. These lids could not be removed during the investigation and their use is unknown.

Tennis courts were present adjacent to the south-west border of the investigation area, and there was a small construction zone observed at the southern foot of the loading dock driveway which was fenced in and had a demountable located on it. The remainder of the Phase 1 development area was characterised by a large multi-storey hospital ward, a number of smaller, older satellite buildings, hospital access roads and soft landscaped areas.

7.1.2. Geology and Hydrogeology

Published geological maps (Sydney 1:100 000 Geological Sheet 9130, 1st edition. Geological Survey of New South Wales, Sydney) indicate the site locality is underlain by several geological units as summarised below:

- Ashfield Shale (dark grey to black shale with laminite) capping the main peninsula ridgeline and forming the foreshores of Bray's Bay.
- Hawkesbury Sandstone (medium to coarse-grained quartz sandstone with minor shale and laminite lenses) underlying the Ashfield Shale, outcropping at lower elevations at the eastern and southern ends of the peninsula;
- Quaternary Alluvium (silty to peaty quartz sand, silt and clay) overlying the Ashfield Shale and Hawkesbury Sandstone at the south of the hospital precinct on the northern shores of Yaralla Bay.

Based on the local topography of the Phase 1 investigation area, it is anticipated that regional groundwater beneath this portion of the site would flow south and east towards Yaralla Bay and north towards Brays Bay.

7.1.3. Local Sensitive Receptors

There are no surface water features which pass through the site. The nearest surface water features are Yaralla Bay, located approximately 160 m south-east of the investigation area and Brays Bay 270 m north of the investigation area.

7.1.4. Acid Sulfate Soils

Based on information provided in the Canada Bay Local Environmental Plan (LEP) 2013 Acid sulfate soil maps, acid sulfate soils are likely to be present in estuarine alluvium present along the foreshore of the site.

In consideration of the elevation and geological setting of the investigation area, it is assessed that there is a lower likelihood that acid sulfate soils are present. The Atlas of Australian Acid Sulfate Soils (ASS) compiled by CSIRO indicated that the Phase 1 investigation area is located in an area of low probability and low confidence for acid sulfate soils to occur.

7.2. Public Register Search

7.2.1. NSW EPA Contaminated Land Registers

Coffey undertook a search of the NSW EPA online Contaminated Land: Record of Notices on the 11th December 2017 for the site. The search did not identify any notices that have been issued by the NSW EPA under the Contaminated Land Management Act (1997) for the site, or for properties immediately surrounding the site.

Coffey also undertook a search on the 11th December 2017 of the NSW EPA online List of NSW Contaminated Sites Notified to EPA. The search did not identify any notices for the site. A Caltex petrol station located at 369 Concord Road, approximately 250 m west of the site was listed on the register, however it was given the designated of Regulation under CLM Act not required, indicating the EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required. Furthermore, review of the distance and topographic profile between the site and the Caltex service station indicated that potential contamination from the service station would be unlikely to impact the site.

7.2.2. Protection of the Environment Operation Act 1997 Register

A search of the NSW EPA Protection of the Environment Operation Act public register was conducted by Coffey on 11th December 2017. The POEO public register indicated that no licensed activities under the POEO Act 1997 are currently being carried out at the site.

7.2.3. Registered Groundwater Bore Search

A search of groundwater bore licenses was undertaken on the 11th December 2017 using the NSW Department of Primary Industries, Office of Water website (http://allwaterdata.water.nsw.gov.au/water.stm). The search did not identify any registered groundwater bores within a 500m radius of the site.

7.2.4. NSW State Heritage Search

A search of the NSW Office of Environment and Heritage register for aboriginal places and state heritage listed sites (http://www.environment.nsw.gov.au/heritageapp/heritagesearch.aspx) was undertaken on 11th December 2017. The site was not identified on the register as having items listed under the NSW Heritage Act. However, items present on the site were identified as items listed by local government and state agencies and included the following:

- Concord Repatriation Hospital – main building; and
- Concord Repatriation Hospital – grounds and layout;

In addition, Thomas Walker Convalescent Hospital located 260 m north of the site was listed on under the NSW Heritage Act due to its national heritage significance as a rare major institution which has survived along the foreshores of the Parramatta River from the 19th century. The property was also identified as having items listed by local government and state agencies which included the following items:

- The former children's hospital;
- A former cottage;
- The entry gate/gatehouse;
- The grounds and public gardens;
- The main building;
- The former stables;
- The store/garage; and
- The Watergate (dock/wharf building).

7.2.5. NSW EPA Former Gasworks Register

A search of NSW EPA List of Former Gasworks was undertaken on the 11th December 2017. The search identified did not identify any former gasworks within 500 m of the site.

8. Previous Reports

Coffey has reviewed the following reports pertaining to the site:

- Douglas Partners, 2016. Preliminary Site Contamination Investigation with Limited Soil Sampling Proposed Concord Repatriation General Hospital Redevelopment Hospital Road, Concord West, NSW (Ref: 85326.01.R.001.Rev1, 10th June 2016) (DP 2016);

- Jacobs, 2017. Schematic Design Report. Concord Repatriation General Hospital Redevelopment – Phase 1 (Ref: 170130 CRGH SD Report V03, 30th January 2017)

8.1. Douglas Partners Preliminary Site Contamination Investigation

Douglas Partners was engaged to undertake a Preliminary Site Contamination Investigation (PSI) in June 2016 which included limited soil sampling at the site. The PSI included a review of available historical records including aerials and council records. Investigation works included drilling seven boreholes using a truck-mounted drill rig to a minimum of 0.5 m into natural material or refusal. DP submitted a total of 12 samples for laboratory analysis for a selection of contaminants of potential concern (CoPC).

A historical aerial photograph review was undertaken for 1930, 1943, 1952, 1970, 1982, 2002, and 2016 with the following noted:

- The hospital was established in 1940, prior to which the hospital area was undeveloped with partially vacant land. A number of buildings were added during the intervening period including Buildings 60, 61 and 63 (1950's), and several buildings altered including Buildings 62 and 64
- The main car park (presumed to mean the main (northern) hospital car park) was established between the 1950's and 1970's;
- Construction of new hospital buildings was noted to have occurred between 2002 and 2009 in the north-eastern portion of the hospital, towards the end of the peninsula.

The report review of City of Canada Bay Council information provided documents which indicated the following:

- A former incinerator was present at the site, adjacent to Building 62;
- In 1979, Council suspected Concord Hospital of dumping ash (sourced from the boiler house) in the hospital car park (presumed to mean the main (northern) hospital car park);
- Concord Hospital received numerous complaints from local residents in the late 1970's and early 1980's regarding fallout of soot on their properties reportedly originating from the hospital incinerator;
- The hospital's reported response was to use extreme care in order to reduce emissions to a minimum;
- The burning of medical waste reportedly ceased in the late 1990's. Contaminated waste including infected clinical waste and cytotoxic waste was collected by a licensed contractor and disposed off site.

The analytical results from samples collected as part of the investigation indicated concentrations of CoPC including benzene, toluene, ethylbenzene, and xylene (BTEX), polychlorinated byphenyls (PCB), organochlorinated pesticides (OCP), phenols and asbestos were less than the laboratory practical quantification limits (PQL). However, the investigation identified concentrations of benzo(a)pyrene (BaP) and total recoverable hydrocarbons (TRH) C_{16} -C_{34} which exceeded the adopted site assessment criteria within a near surface sample which DP attributed to being reflective of the chemical components in the asphaltic pavement material overlying the material from which the sample was collected and concluded that further investigation and/or remediation was not required.

8.2. Jacobs Schematic Design Report

Jacobs was engaged to provide a schematic design report to document the progression of the development from the concept design phase through to the conclusion of schematic design (planning phase) for the Concord Repatriation General Hospital (CRGH) redevelopment.

The report listed the centre-piece of the redevelopment as the Rusty Priest Centre for Rehabilitation and Aged Care that is to be delivered in Phase 1A of the development. The proposed building is to re-house and expand the Aged Health and Rehabilitation services, Veteran's Physical and Mental Health Treatment, and Rehabilitation services. Phase 1B will accommodate Cancer Care services as well as inpatient services in new purpose-built facilities.

9. Data Gaps and Uncertainties

Based on the review of the Douglas Partners PSI and the preliminary site walkover, the data gaps were considered to include the following:

- Presence of a suspected UST within the investigation area;
- Fill material of unknown origin or quality; and
- Presence of an interceptor trap within the investigation area.

10. Investigation Work to Address Data Gaps

10.1. Preliminary Conceptual Site Model

Based on the information reviewed and visual observations, potential areas of environmental concern (AEC) and exposure scenarios considered for assessment are summarised in Table 10.1. The likelihood of potential contamination and associated CoPC are also outlined in the table.

Table 10.1: Preliminary conceptual site model – Phase 1 Investigation Area

AEC	Potential contamination description	Likelihood of potential Contamination	CoPC	Potential Receptors & Exposure pathways
AEC1: Fill within the investigation area	Fill material including ash and clinker associated with incinerator, or fill associated with poor demolition practices	Medium	TRH, BTEX, PAH, metals and asbestos	Construction workers and future maintenance workers from direct contact, and inhalation of dust, asbestos fibres and vapours Future site users from direct contact, ingestion and inhalation of dust and asbestos fibres
AEC2: Suspected underground storage tank in the loading dock area	Potential leaks or spills of suspected UST(s).	Low – Medium	TRH, PAH and Lead (BTEX if UST stored petrol)	Construction workers, future maintenance workers and future site users from direct contact, and inhalation of dust and vapours
AEC3: Potential interceptor trap (IT) in the loading dock area	Potentially leaks associated with an interceptor trap	Low – Medium	TRH, PAH, BTEX	Construction workers and future maintenance workers from direct contact, and inhalation of vapours

TRH: Total recoverable hydrocarbons
BTEX: Benzene, toluene, ethylbenzene and xylene compounds
PAH: Polycyclic aromatic hydrocarbons

10.2. Scope of Investigation Works

Phase 1 investigation works were undertaken by Coffey between 23 November and 14 December 2017. Groundwater sampling was carried out on 21st December 2017.

In summary, field works comprised the following:

- Location and clearance of underground services, and set out of proposed soil bores at cleared locations;
- Drilling of 2 boreholes using a track mounted drill rig (ie. BH101 and BH102) to depths ranging between 5.97 mBGL and 8.00 mBGL;
- Soil samples were collected from each borehole location with two primary samples from each borehole location submitted for chemical analysis;
- Both boreholes were converted to monitoring wells to facilitate groundwater sampling; and
- Quality control sampling was undertaken as per the schedules provided in Appendix G.

10.3. Sampling Rationale

The sample locations were targeted to address the data gaps identified by the 2016 Douglas Partners PSI and in the preliminary site walkover of the investigation area.

Following review of the 2016 PSI, the preliminary site walkover undertaken by Coffey identified the location of the suspected UST (AEC2), as identified by DP however on inspection, the visual appearance of the feature was consistent with a subsurface utility pit commonly used to cover sewer/stormwater manholes, or interceptor trap (IT) (AEC3).

The locations of boreholes BH101 and BH102 were selected to target AEC2 and AEC3 while at the same time collecting samples of fill from the investigation area (AEC1) to supplement data collected from the previous investigation completed by DP. BH101 was located up gradient and BH102 located downgradient of the suspected UST/IT location. These boreholes were positioned in areas to avoid damage to subsurface infrastructure.

Following sampling, the soil bores were converted to groundwater monitoring wells and sampled to assess for the presence of CoPC associated with either a UST/IT in the groundwater.

10.4. Investigation and Soil Sampling Methodology

In general, the investigation and soil sampling methodology is outlined in Table 10.2.

Table 10.2: 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. Following service clearance, a GPR survey was undertaken within the investigation area to check for the presence and assess the extent of UST or IT.
Borehole Drilling	Where present, asphalt surfacing was cored using a large diameter circular cutting bit and removed. Boreholes were drilled using a tracked mounted rig equipped with solid flight augers with

Activity	Detail / Comments
	samples collected from the auger bit. Once rock was encountered, the boreholes were cored using NMLC methods to target depth. Drilling locations were recorded using a hand-held GPS unit by the Coffey engineer supervising the drilling works.
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 AS 1726-2017, Geotechnical Site Investigations and AS 4482.1-2005 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 split tube or auger bit were placed as quickly as practicable into sample jars. Sample jars were filled to the top to minimise headspace. Visual, olfactory, and field screening data were recorded (refer Borehole Logs; Appendix E). Separate samples of fill (approximately 50g mass) was collected for asbestos analysis and placed in double zip lock bags.
Soil Splitting	Duplicate samples were collected by dividing soils collected from the hand auger/split tube and placed into two separate laboratory jars. Blind duplicate samples were denoted 'DUP' (e.g. DUP1, DUP2 etc.).
Soil Screening	Field headspace screening using a Photo-ionisation Detector (PID) with a 10.6eV lamp was undertaken where possible 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 H.
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	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 flight auger during the soil sampling programme following decontamination.
Disposal of soil cuttings	In general, boreholes were backfilled with drill cuttings and the top 200mm (approximate) was plugged with concrete.

10.5. Groundwater Well Installation and Sampling Methodology

The methodology to install, develop and sample groundwater monitoring wells on the site is outlined in Table 10.3.

Table 10.3: Groundwater Well Installation, Development and Sampling Methods

Activity	Detail / Comments
Well Installation	Both boreholes, BH101 and BH102, were converted to groundwater monitoring wells. The monitoring wells installed within the investigation area were positioned to assess the status of groundwater in the vicinity of where the UST was suspected to be located and to determine whether the need for further investigation was required. 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 0.5m 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. In addition to the groundwater wells installed in the investigation area, five additional groundwater wells were installed in the Phase 2 (BH205 and BH211) and Phase 3 (BH302, BH307 and BH310) development areas. Well installation details are presented in the borehole logs included in Appendix E.
Well development	Well development was undertaken shortly after well installation the wells were developed to remove fine sediment and to maximise the hydraulic connectivity between the wells and the groundwater aquifer in preparation for subsequent sampling. Development was undertaken using dedicated disposable high density polyethylene (HDPE) bailers. A minimum of four well volumes were removed from each well, or wells were purged dry. Following well development hydro-sleeves were installed in each well and left for a minimum of seven days to stabilise.
Groundwater Level & NAPL Measurements	Groundwater levels and the presence of Non-Aqueous Phase Liquids (NAPL) were recorded using an oil/water interface probe (IP).
Sampling Method Water Quality parameters	During remobilisation to undertake groundwater sampling, it was determined that well BH101 had not recharged with groundwater and therefore a groundwater sample could not be recovered for laboratory analysis. Groundwater sample from BH102 was recovered from each of the monitoring wells using a disposable hydro-sleeve in accordance with Coffey SOP. Groundwater sampling results are provided in Table T4 in the Tables section and the laboratory results supplied in Appendix F.
Water Quality parameters	Following retrieval of the hydro-sleeve water quality parameters were documented for pH, Temperature, Dissolved Oxygen, Electrical Conductivity and Redox Potential.
Sample Splitting	Duplicate samples were collected by filling up two additional sample containers simultaneously during collection of the primary sample.
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 hydro-sleeves 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.

10.6. Quality Assurance / Quality Control

A quality assurance/quality control plan was designed to achieve predetermined data quality objectives (DQOs) and to demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated and the procedures for assessing the DQOs are met.

The field and laboratory QA/QC procedures adopted and summary of QA/QC results for this DSI are provided in Appendix G. In summary, the data is considered to be adequately complete, comparable, representative, precise, accurate and usable for the objective of the works.

10.7. Laboratory Details

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

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

11. Assessment Criteria

To assess the significance of contaminant concentrations in soil, reference was primarily made to NEPM 2013, specifically 'Schedule B1 Guideline on Investigation Levels for Soil and Groundwater' (Schedule B1). Schedule B1 provides a framework for the use of investigation and screening levels based on human health and ecological risks.

Schedule B1 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 investigation area 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.
- 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, within the upper floors of the development.

- Site visitors attending the site periodically for short durations to visit persons attending the medical facility, including basement.

Whilst 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), Coffey has adopted HIL D criteria based on the following considerations:

- Sensitive populations would occupy the upper floors of the development, and only pass through the ground floor atrium area intermittently. It is considered unlikely that sensitive populations would access the loading dock in the basement.
- Opportunities for direct access to soil on site will be minimal.

Soil health investigation levels (HILs), soil health screening levels (HSLs) and petroleum hydrocarbon management limits were adopted from Schedule B1 of NEPM 2013 while Direct Contact criteria for petroleum hydrocarbons were adopted from CRC CARE 2011. Table T1 in Appendix F of this report details the soil criteria which was adopted for the assessment.

Ecological investigation levels (EILs), and ecological screening levels (ESLs) were not considered as they were not deemed to be applicable for this investigation.

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 for beneficial uses on site is not proposed as part of the development.

Schedule B1 presents groundwater Health Screening Levels (HSL) for vapour intrusion pathway. The field investigations recorded standing water levels in BH102 at 4.18mbgs (i.e. approx. RL 4.1mAHD). Given that the development will construct a basement with a formation level of 4.0mAHD, which is broadly consistent with the standing water levels within the investigation area, the HSL presented within Schedule B1 are not considered appropriate.

For the purposes of this assessment, the Limit of Reporting (LOR) has been adopted as the HSL for volatile compounds within groundwater.

Table T4 in Appendix F of this report details the groundwater criteria which was adopted for the assessment. The adopted groundwater investigation levels (GILs) were based on the investigation levels outlined in NEPM 2013. The GILs are based on the Australian and New Zealand Environment Conservation Council (ANZECC) (2000) Guidelines for marine water quality.

12. Investigation Findings

12.1. Documentation Review and GPR Survey

Review of utility drawings provided by the Sydney Local Health District for the loading dock area did not identify the presence of a UST within the investigation area. LTS Drawing 43291DT; Sheet 2 of 12 dated 16 May 2016 (refer Appendix I) shows the location of stormwater and sewer drainage services. These records show the utility pit covers suspected by DP to be UST to be associated with sewer drainage services or an IT. This correlates with the understanding of hospital maintenance staff based on site.

The GPR survey undertaken by Geotrace also did not identify anomalies in the vicinity of the utility pit that were consistent with a UST. That is, interference consistent with a metal vessel or void that extended laterally beyond the extent of the utility pit cover was not reported.

12.2. Subsurface Profile

At the time of the fieldwork, surface coverage in the loading dock area was characterised by bitumen hardstand.

Fill material was encountered within both borehole locations in the investigation area and generally consisted of fine to medium grained, yellow to dark brown gravelly sand and silty sand which was underlain by dark grey gravelly clay with medium to high plasticity. Natural soil was identified at depths ranging from 0.9 mBGL to 1.1 mBGL and consisted of dark brown clay with high medium to high plasticity and yellow to brown silty clay with low plasticity that was underlain by yellow to brown shale. No staining or odours associated with hydrocarbons were noted nor were suspected asbestos-containing materials (ACM) identified at any of the boreholes located within the investigation area.

Field indicators of potential acid sulfate soils comprising presence of shells, jarositic horizons or sulfidic odours were not noted during sampling.

12.3. Soil Headspace Screening Results

Soil samples were screened for the potential presence of VOCs using a PID. The PID readings ranged from 0.8 ppm to 4.1 ppm, indicating that VOCs were unlikely to be present at significant concentrations.

Individual PID readings are reported on the borehole logs presented in Appendix D.

12.4. Groundwater Conditions

Standing water levels were measured using an electronic dual phase interface probe, which are presented within Table 12.1. Standing water levels reported in monitoring wells installed within Phases 2 and 3 are included in Table 12.1 to provide an overview of groundwater conditions across the site.

Table 12.1: Gauging Information

Monitoring Well	Date	SWL (m) below TOC*	Depth to base of well (m BTOC)	LNAPL Identified	Investigation Phase
BH101	14/12/2017	-	5.97	None	Phase 1
BH102	14/12/2017	4.18	8.0	None	Phase 1
BH205	24/11/2017	3.27	9.38	None	Phase 2
BH211	21/11/2017	0.815	3.345	None	Phase 2
BH302	27/11/2017	2.94	8.82	None	Phase 3
BH307	29/11/2017	3.28	9.78	None	Phase 3
BH310	01/12/2017	1.43	8.925	None	Phase 3

* TOC: top of casing, SWL: standing water level, RWL: reduced water level, LNAPL: Light non-aqueous phase liquid

Groundwater was encountered within shale at a depth of approximately 4.18 mBGL, and was likely perched water within the geological unit.

Given the local topography and proximity to Yaralla Bay, groundwater within the investigation area was inferred to flow south and east towards Yaralla Bay.

Hydrocarbon odours, sheen or visual indicators of contamination were not identified in the groundwater sampled from BH102, nor were these indicators identified in the wells located outside the investigation area.

Results of the water quality parameters (after stabilisation) collected prior to sampling are summarised in Table 12.2.

Table 12.2: Water Quality Parameters

Monitoring Well	pH	Redox (mV)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Temperature (°C)	Investigation Phase
BH101	-	-	-	-	-	Phase 1
BH102	7.39	42	1743	1.47	21.3	Phase 1
BH205	6.28	24	1303	2.71	20.7	Phase 2
BH211	7.06	-29	9900	1.18	22.6	Phase 2
BH302	5.68	62	7160	1.88	21.0	Phase 3
BH307	6.25	41	6660	1.87	22.6	Phase 3
BH310	6.47	81	7380	1.77	23.5	Phase 3

13. Results

13.1. Soil Analytical Results

While concentrations of some metals, PAHs and TRH exceeded the LOR, all concentrations were less than the adopted health criteria. Asbestos was not detected at the reporting limit of 0.1 g/kg in the soil sample analysed.

Review of the DP 2016 PSI indicated that no intrusive sampling was undertaken within the investigation area, however limited sampling was conducted down gradient of the loading dock. Review of analytical results from samples collected from these locations (DP boreholes: BH12, BH14, BH15 and BH17) indicated that with the exception of TRH C_{16} – C_{34} concentrations of CoPC were less than the commercial/industrial criteria adopted by DP.

The following samples collected in the DP 2016 PSI exceeded the adopted criteria:

- Concentrations of TRH C_{16} – C_{34} (3,600 mg/kg) in DP sample BH12-0.1 marginally exceeded the TRH management limits for that fraction (3,500 mg/kg).

Laboratory results for samples collected from the investigation area are provided in Appendix F. These results have been collated with results from previous investigations and presented within Table T1 in the ‘Tables’ section of this report.

13.2. Groundwater Analytical Results

Concentration of CoPC within groundwater were generally less than the laboratory LOR and adopted groundwater assessment criteria, with the exception of the following:

Phase 1 Investigation Area

- Concentrations of copper within sample BH102 were detected at concentrations which exceeded the adopted Groundwater Investigation Levels (GIL) for marine waters; and
- Concentrations of zinc within samples BH102 were detected at concentrations which exceeded the adopted GIL for marine waters.

Phase 2 and 3 Investigation Areas

- Concentrations of copper within samples BH205 and DUP2_21_12_17 were detected at concentrations which exceeded the ANZECC Marine Water 95% guidelines;
- Concentrations of nickel within samples BH302 and BH307 were detected at concentrations which exceeded the ANZECC Marine Water 95% guidelines;
- Concentrations of nickel within samples BH205, , BH310, Dup1_21_12_17 and DUP2_21_12_17 were detected at concentrations which exceeded the adopted GIL for marine waters; and
- Concentrations of zinc within samples BH205, BH302, BH307, BH310 and DUP2_21_12_17 were detected at concentrations which exceeded the ANZECC Marine Water 95% guidelines.

Laboratory results are provided in Appendix F and are summarised in Table T4 in the 'Tables' section of this report.

14. Discussion

The following sections presents a discussion of the investigation findings with regard to the data gaps identified in Section 9:

14.1. AEC 1: Fill Material of Unknown Origin or Quality

While fill was identified within the investigation area, concentrations of CoPC in samples analysed were less than the adopted health criteria.

Concentrations of copper, nickel and zinc were noted within groundwater sample BH102, collected from within the investigation area. The concentrations were consistent with groundwater samples collected from the Phase 2 and Phase 3 investigation areas. It is considered that these concentrations of heavy metals were likely indicative of background levels present within the surrounding urban environment rather than point sources within the investigation area.

Interrogation of the DP 2016 PSI indicated that no intrusive soil sampling was conducted in the loading dock area to provide supplementary analytical data for the investigation area. Soil data from samples collected from the surrounding areas indicated that with the exception of TRH C_{16} – C_{34} in DP sample BH12/0.1, concentrations of CoPC were less than the adopted criteria. DP 2016 PSI concluded the exceedances identified at BH12 were likely to be associated with overlying the bitumen pavement.

14.2. AEC2/AEC3: Suspected Underground Storage Tank or Interceptor Trap in the Loading Dock Area

Coffey determined it was unlikely that a UST was present within the investigation based on the following lines of evidence:

- Service utility drawings did not identify the presence of a UST;
- Anecdotal discussions with hospital maintenance staff indicated that a UST was unlikely to be present and that the service utility pit covers relate to either stormwater or sewer utilities;
- The GPR survey did not identify interference consistent with a metal vessel or void that extended laterally beyond the extent of the utility pit cover;
- The site walkover did not identify infrastructure such vents, fill point or bowsers;
- The surface features of the suspected UST service lid were visually consistent with the features of an utility pit covers or interceptor trap (IT);

The investigation identified that while an IT may be present within the investigation area, it is unlikely to have leaked do to the following:

- Review of soil analytical results from samples collected from the investigation area indicated that concentrations of CoPC associated with an IT were less than the adopted criteria.
  - While concentrations of TRH in the C_{16}-C_{34} and C_{34}-C_{40} fractions were identified in sample BH102/0.05-0.2, TRH detections were limited to the near surface material indicating it was unlikely for a leak to have occurred.
  - Taking into consideration the ratio between PAH and TRH concentrations in those samples, the detections were likely to be associated with bitumen present in the fill.
- Groundwater was not encountered at BH101, however hydrocarbon odours and staining were not noted in the soil during sample collection or during well installation.
- Groundwater well BH102 was positioned downgradient from the suspected IT location. Analytical results from groundwater sample BH102 indicated that concentrations of PAH, BTEX and TRH were below the laboratory limit of reporting.

15. Conclusion

The 2016 PSI undertaken by Douglas Partners concluded that the Phase 1 development area was suitable for the proposed development subject to further investigation regarding a suspected UST. In addition to the suspected UST, Coffey identified additional data gaps including fill of an unknown origin or quality, and the presence of an interceptor trap within the investigation area.

In completing the investigation, Coffey determined the following:

- Fill is present within the investigation however is unlikely to pose a health risk;
- Evidence obtained during the investigation including documentation review, discussions with hospital maintenance staff, GPR survey and site inspection indicated that a UST is unlikely to be present in the loading dock area;
- Observations made of the suspected UST location indicate it is likely to be an interceptor trap. Further investigation may be required to confirm this, and consideration should be given to the IT's presence during excavation and redevelopment works.

In completing this assessment Coffey concludes that the investigation area is suitable for the proposed development.

Figures

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

50 0 50 100 150

Scale (metres) 1:3000

drawn	SH / AW
approved	-
date	10 / 01 / 18
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

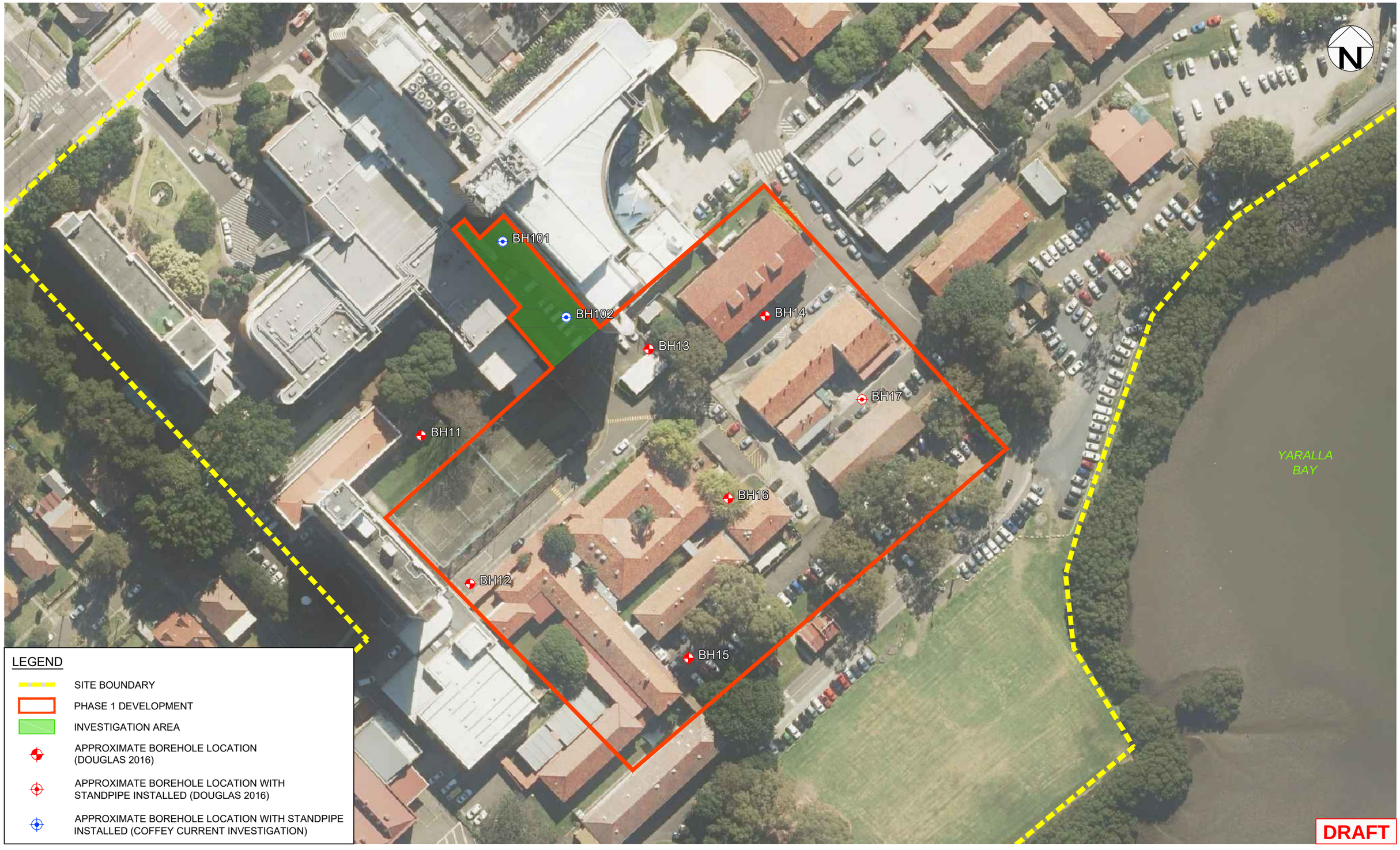
client: HEALTH INFRASTRUCTURE

project: CONCORD HOSPITAL PHASE 1 DEVELOPMENT
HOSPITAL ROAD, CONCORD, NSW

title: SITE LOCATION PLAN

project no: 754-SYD211253-AF | figure no: FIGURE 1 | rev: A

PLOT DATE: 10/01/2018 4:30:03 PM DWG FILE: F:\1. PROJECTS\4. SYD-GEOTECHNIC\2017\SYDGE211253 - CONCORDHOSPITAL\12. CAD\754-SYDGE211253-AF.DWG



LEGEND

- SITE BOUNDARY
- PHASE 1 DEVELOPMENT
- INVESTIGATION AREA
- APPROXIMATE BOREHOLE LOCATION (DOUGLAS 2016)
- APPROXIMATE BOREHOLE LOCATION WITH STANDPIPE INSTALLED (DOUGLAS 2016)
- APPROXIMATE BOREHOLE LOCATION WITH STANDPIPE INSTALLED (COFFEY CURRENT INVESTIGATION)

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

10 0 10 30 50

Scale (metres) 1:1000

drawn	SH / AW
approved	-
date	10 / 01 / 18
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: HEALTH INFRASTRUCTURE

project: CONCORD HOSPITAL PHASE 1 DEVELOPMENT
HOSPITAL ROAD, CONCORD, NSW

title: PHASE 1 BOREHOLE LOCATION PLAN

project no: 754-SYD211253-AF | figure no: FIGURE 2 | rev: A

PLOT DATE: 10/01/2018 4:24:46 PM DWG FILE: F:\1. PROJECTS\4. SYD-GEOTECH\NICS\2017\SYDGE211253 - CONCORD\HOSPITAL\12. CAD\754-SYDGE211253-AF.DWG

Tables

				Inorganics	Asbestos	BTEX				Metals								PAHs											
				Moisture	Asbestos	Benzene	Ethylbenzene	Toluene	Xylene Total	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Benzo(b+j)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ calc (Zero)	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene
				%	g/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PQL					0.1	0.1	0.1	0.1	0.3	2	0.4	5	5	5	0.1	5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TRH Management Limits - Comm/Ind (course)																													
NEPM (2013) HIL - D (Comm/Ind)										3000	900	3600	240,000	1500	730	6000	400,000							40					
NEPM (2013) HSL - D (Sand) 0 to <1m						3	NL	NL	230																				
CRC Care - Human Health - Direct Contact HSL-D						430	27,000	99,000	81,000																				
CRC Care - Intrusive Maintenance Worker 0 to <2 m Vapour Intrusion (Shallow Trench - Sand)						77	NL	NL	NL																				
CRC Care (2011) HSLs for Soil Direct Contact Intrusive Maintenance Worker						1100	85,000	120,000	130,000																				
Coffey ID	**Sample_Depth**	**Sample_Date**	**Matrix**																										
BH101_0.5-0.65	0.5-0.65	23-11-17	Soil	11	NAD	<0.1	<0.1	<0.1	<0.3	2.5	<0.4	<5	11	16	0.2	<5	30	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5
BH101_1.0-1.11	1.0-1.11	23-11-17	Soil	6.9	-	<0.1	<0.1	<0.1	<0.3	8	<0.4	9.4	30	30	<0.1	31	120	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5
BH102/0.05-0.2	0.05-0.2	14-Dec-17	Soil	10	-	<0.1	<0.1	<0.1	<0.3	6	<0.4	8.9	40	22	<0.1	11	230	5.1	0.9	<0.5	1.5	4.7	4.2	6.2	6.2	6.2	3.2	1.7	4.1
BH102/1.1-1.3	1.1-1.3	14-Dec-17	Soil	7.7	-	<0.1	<0.1	<0.1	<0.3	6.1	<0.4	9.2	33	21	<0.1	8.2	74	1.4	<0.5	<0.5	<0.5	1.5	1.3	1.8	2	2.3	1	0.6	1.3
DUP1_14.12.17	0.05-0.2	14-Dec-17	Soil	7	-	<0.1	<0.1	<0.1	<0.3	3.7	<0.4	12	72	21	<0.1	11	590	11	2.7	<0.5	4.5	11	9.9	15	15	15	7	4.6	10
DUP2_14.12.17	0.05-0.2	14-Dec-17	Soil	6.9	-	<0.2	<0.5	<0.5	<0.5	<5	<1	19	42	17	<0.1	15	376	21.7	3.9	0.8	6.1	1.6	17.6	25	25	25	9.9	9.5	15.9
Douglas Partners ID																													
BH12	0.1	23-02-16	Soil	3.4	NAD	<0.2	<0.5	<1	<3	<4	<0.4	28	29	5	<0.1	39	22	41	8.9	0.7	12	33	24	34	34	34	7.3	41	29
BH12	0.5	23-02-16	Soil	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	1	23-02-16	Soil	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	0.1	29-02-16	Soil	2.7	NAD	<0.2	<0.5	<1	<3	<4	<0.4	25	54	3	<0.1	58	33	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.1	<0.2	<0.1
BH15	0.5	01-03-16	Soil	8.4	NAD	<0.2	<0.5	<1	<3	14	<0.4	16	31	21	<0.1	11	30	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.1	<0.2	<0.1
BH17	0.5	26-02-16	Soil	17	NAD	<0.2	<0.5	<1	<3	10	<0.4	22	28	96	<0.1	6	200	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.1	<0.2	<0.1

NAD - No Asbestos Detected

													TRH					
				Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	F1: C6-C10 less BTEX	F2: C10-C16 less NAPHTHALENE	C6-C10	C10-C16	C16-C34	C34-C40
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	20	50	20	50	100	100
TRH Management Limits - Comm/Ind (course)														700	1000	3500	10,000
NEPM (2013) HIL - D (Comm/Ind)											4000						
NEPM (2013) HSL - D (Sand) 0 to <1m												260	NL				
CRC Care - Human Health - Direct Contact HSL-D								11,000						26,000	20,000	27,000	38,000
CRC Care - Intrusive Maintenance Worker 0 to <2 m Vapour Intrusion (Shallow Trench - Sand)								NL				NL	NL				
CRC Care (2011) HSLs for Soil Direct Contact Intrusive Maintenance Worker								29,000						82,000	62,000	85,000	120,000
Coffey ID	**Sample_Depth**	**Sample_Date**	**Matrix**														
BH101_0.5-0.65	0.5-0.65	23-11-17	Soil	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<50	<100	<100
BH101_1.0-1.11	1.0-1.11	23-11-17	Soil	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<50	<20	<50	<100	<100
BH102/0.05-0.2	0.05-0.2	14-Dec-17	Soil	0.5	11	<0.5	2.5	<0.5	3.5	11	53.9	<20	<50	<20	<50	510	100
BH102/1.1-1.3	1.1-1.3	14-Dec-17	Soil	<0.5	3.7	<0.5	0.8	<0.5	1	3.8	16.4	<20	<50	<20	<50	<100	<100
DUP1_14.12.17	0.05-0.2	14-Dec-17	Soil	1.3	32	1.3	5.6	<0.5	9.6	33	143.5	<20	<50	<20	<50	1800	460
DUP2_14.12.17	0.05-0.2	14-Dec-17	Soil	1.6	37.7	1.9	7.8	<0.5	1.9	39.7	204	<10	<50	<10	<50	1470	590
Douglas Partners ID																	
BH12	0.1	23-02-16	Soil	1.6	78	2.6	9.7	1	40	74	360	<25	<50	<25	150	3600	1100
BH12	0.5	23-02-16	Soil	-	-	-	-	-	-	-	-	-	-	<25	<50	310	<100
BH12	1	23-02-16	Soil	-	-	-	-	-	-	-	-	-	-	<25	<50	<100	<100
BH14	0.1	29-02-16	Soil	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	Nil+ve	<25	<50	<25	<50	340	550
BH15	0.5	01-03-16	Soil	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	Nil+ve	<25	<50	<25	<50	<100	<100
BH17	0.5	26-02-16	Soil	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	Nil+ve	<25	<50	<25	<50	<100	<100

NAD - No Asbestos Detected

			Lab Report Number	577580	577580		577580	Interlab_D		
			Field ID	BH102/0.05-0.2	DUP1_14.12.17	**RPD**	BH102/0.05-0.2	Dup 2_14.12.17	**RPD**	
			Sampled Date/Time	14-12-17	14-12-17		14-12-17	14-12-17		
Chem_Grd	**ChemName**	**Units**	**EQL**							
BTEX	Benzene	mg/kg	0.1 (Primary): 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.2	0	
	Ethylbenzene	mg/kg	0.1 (Primary): 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0	
	Toluene	mg/kg	0.1 (Primary): 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0	
	Xylene (m & p	mg/kg	0.2 (Primary): 0.5 (Interlab)	<0.2	<0.2	0	<0.2	<0.5	0	
	Xylene (o)	mg/kg	0.1 (Primary): 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0	
	Xylene Total	mg/kg	0.3	<0.3	<0.3	0	<0.3			
	C6-C10 less E	mg/kg	20 (Primary): 10 (Interlab)	<20.0	<20.0	0	<20.0	<10.0	0	
Metals	Arsenic	mg/kg	2 (Primary): 5 (Interlab)	6.0	3.7	47	6.0	<5.0	18	
	Cadmium	mg/kg	0.4 (Primary): 1 (Interlab)	<0.4	<0.4	0	<0.4	<1.0	0	
	Chromium	mg/kg	5 (Primary): 2 (Interlab)	8.9	12.0	30	8.9	19.0	72	
	Copper	mg/kg	5	**40.0**	**72.0**	**57**	40.0	42.0	5	
	Lead	mg/kg	5	22.0	21.0	5	22.0	17.0	26	
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	
	Nickel	mg/kg	5 (Primary): 2 (Interlab)	11.0	11.0	0	11.0	15.0	31	
	Zinc	mg/kg	5	**230.0**	**590.0**	**88**	**230.0**	**376.0**	**48**	
PAH	Acenaphthene	mg/kg	0.5	0.9	2.7	100	0.9	3.9	125	
	Acenaphthyler	mg/kg	0.5	<0.5	<0.5	0	<0.5	0.8	46	
	Anthracene	mg/kg	0.5	1.5	4.5	100	**1.5**	**6.1**	**121**	
	Benzo(a)anthr	mg/kg	0.5	**4.7**	**11.0**	**80**	**4.7**	**17.0**	**113**	
	Benzo(a)pyrer	mg/kg	0.5	**4.2**	**9.9**	**81**	**4.2**	**17.6**	**123**	
	Benzo(a)pyrer	mg/kg	0.5	**6.2**	**15.0**	**83**	**6.2**	**25.0**	**121**	
	Benzo(a)pyrer	mg/kg	0.5	**6.2**	**15.0**	**83**	**6.2**	**25.0**	**121**	
	Benzo(a)pyrer	mg/kg	0.5	**6.2**	**15.0**	**83**	**6.2**	**25.0**	**121**	
	Benzo(g,h,i)pe	mg/kg	0.5	**3.2**	**7.0**	**75**	**3.2**	**9.9**	**102**	
	Benzo(k)fluora	mg/kg	0.5	1.7	4.6	92	**1.7**	**9.5**	**139**	
	Chrysene	mg/kg	0.5	**4.1**	**10.0**	**84**	**4.1**	**15.9**	**118**	
	Benzo[b+j]fluc	mg/kg	0.5	**5.1**	**11.0**	**73**	**5.1**	**21.7**	**124**	
	Dibenz(a,h)an	mg/kg	0.5	0.5	1.3	89	0.5	1.6	105	
	Fluoranthene	mg/kg	0.5	**11.0**	**32.0**	**98**	**11.0**	**37.7**	**110**	
	Fluorene	mg/kg	0.5	<0.5	1.3	89	<0.5	1.9	117	
	Indeno(1,2,3-c	mg/kg	0.5	**2.5**	**5.6**	**77**	**2.5**	**7.8**	**103**	
	Naphthalene	mg/kg	0.5 (Primary): 1 (Interlab)	<0.5	<0.5	0	<0.5	<0.5	0	
	Naphthalene	mg/kg	0.5 (Primary): 1 (Interlab)	<0.5	<0.5	0	<0.5	<0.5	0	
	Phenanthrene	mg/kg	0.5	**3.5**	**9.6**	**93**	**3.5**	**12.4**	**112**	
	Pyrene	mg/kg	0.5	**11.0**	**33.0**	**100**	**11.0**	**39.7**	**113**	
	Total PAHs	mg/kg	0.5	**53.9**	**143.5**	**91**	53.9			
TRH	F2-NAPHTHA	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	
	C6 - C9	mg/kg	20 (Primary): 10 (Interlab)	<20.0	<20.0	0	<20.0	<10.0	0	
	C10 - C14	mg/kg	20 (Primary): 50 (Interlab)	<20.0	<20.0	0	<20.0	<50.0	0	
	C15 - C28	mg/kg	50 (Primary): 100 (Interlab)	**330.0**	**1100.0**	**108**	330.0	900.0	93	
	C29 - C36	mg/kg	50 (Primary): 100 (Interlab)	**210.0**	**740.0**	**112**	210.0	780.0	115	
	C10 - C36 (Su	mg/kg	50	**540.0**	**1840.0**	**109**	**540.0**	**1680.0**	**103**	
	C10-C16	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	
	C16-C34	mg/kg	100	**510.0**	**1800.0**	**112**	**510.0**	**1470.0**	**97**	
	C34-C40	mg/kg	100	100.0	460.0	129	100.0	590.0	142	
	C6 - C10	mg/kg	20 (Primary): 10 (Interlab)	<20.0	<20.0	0	<20.0	<10.0	0	

*RPDs have only been considered where a concentration is greater than 0 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 2000 (0-10 x EQL); 50 (10-20 x EQL); 30 (> 20 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those use

Concord Hospital - Phase 1 DSI
Table T3 - Rinsates

Client: Johnstaff

SDG	14-Dec-17
Field ID	R1_14.12.17
Sampled_Date/Time	14-12-17
Sample Type	Rinsate

Chem_Group	ChemName	Units	PQL	
BTEX	Benzene	µg/l	1	<1
	Ethylbenzene	µg/l	1	<1
	Toluene	µg/l	1	<1
	Xylene (m & p)	µg/l	2	<2
	Xylene (o)	µg/l	1	<1
	Xylene Total	µg/l	3	<3
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02
Metals	Arsenic	mg/l	0.001	<0.001
	Cadmium	mg/l	0.0002	<0.0002
	Chromium	mg/l	0.001	<0.001
	Copper	mg/l	0.001	<0.001
	Lead	mg/l	0.001	<0.001
	Mercury	mg/l	0.0001	<0.0001
	Nickel	mg/l	0.001	<0.001
	Zinc	mg/l	0.005	**0.006**
PAH	Acenaphthene	µg/l	1	<1
	Acenaphthylene	µg/l	1	<1
	Anthracene	µg/l	1	<1
	Benzo(a)anthracene	µg/l	1	<1
	Benzo(a)pyrene	µg/l	1	<1
	Benzo(g,h,i)perylene	µg/l	1	<1
	Benzo(k)fluoranthene	µg/l	1	<1
	Chrysene	µg/l	1	<1
	Benzo[b+j]fluoranthene	mg/l	0.001	<0.001
	Dibenz(a,h)anthracene	µg/l	1	<1
	Fluoranthene	µg/l	1	<1
	Fluorene	µg/l	1	<1
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1
	Naphthalene	µg/l	1	<10
	Phenanthrene	µg/l	1	<1
	Pyrene	µg/l	1	<1
	Total PAHs	µg/l	1	<1
TPH	F2-NAPHTHALENE	mg/l	0.05	<0.05
	C6 - C9	µg/l	20	<20
	C10 - C14	µg/l	50	<50
	C15 - C28	µg/l	100	<100
	C29 - C36	µg/l	100	<100
	C10 - C36 (Sum of total)	µg/l	100	<100
	C10-C16	mg/l	0.05	<0.05
	C16-C34	mg/l	0.1	<0.1
	C34-C40	mg/l	0.1	<0.1
	C6 - C10	mg/l	0.02	<0.02

				BTEX						Metals								PAH																		
				Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Benzo[b+j]fluoranthene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL				1	1	1	2	1	3	0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	0.05	0.05	0.05	0.05	0.01	0.05	0.05	0.05	0.00005	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
ANZECC 2000 Marine water 95%				700							0.0055		0.0013	0.0044	0.0004	0.07	0.015														70			
ANZECC 2000-Low Reliability Trigger Values for PAH in Marine 95%																				0.4		0.2						1.4			70	2		
NEPM 2013 Commercial/industrial GW HSL D Vapour Intrusion, 2m to <4m, Sand				5000																														
NEPM 2013 GILs, Marine Waters(A)				500							0.0007		0.0013	0.0044	0.0001	0.007	0.015														50			
Field_ID	**LocCode**	**Sampled_Date-Time**	**SampleCode**																																
BH102_GME	BH102	21-Dec-17	M17-De32014	<1	<1	<1	<2	<1	<3	0.002	<0.0002	<0.001	0.002	<0.001	<0.0001	0.006	0.028	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH205_GME	BH205	21-Dec-17	M17-De32015	<1	<1	<1	<2	<1	<3	0.002	<0.0002	<0.001	0.003	<0.001	<0.0001	0.024	0.096	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH211_GME	BH211	21-Dec-17	M17-De32016	<1	<1	<1	<2	<1	<3	0.003	<0.0002	<0.001	<0.001	<0.001	<0.0001	0.007	<0.005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH302_GME	BH302	21-Dec-17	M17-De32017	<1	<1	<1	<2	<1	<3	0.003	0.0005	<0.001	<0.001	<0.001	<0.0001	0.16	0.62	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH307_GME	BH307	21-Dec-17	M17-De32018	<1	<1	14	<2	<1	<3	0.007	<0.0002	<0.001	<0.001	<0.001	<0.0001	0.12	0.041	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH310_GME	BH310	21-Dec-17	M17-De32019	<1	<1	<1	<2	<1	<3	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.0001	0.009	0.018	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DUP1_21_12_17_GME	BH211_GME	21-Dec-17	M17-De32021	<1	<1	<1	<2	<1	<3	0.004	<0.0002	<0.001	<0.001	<0.001	<0.0001	0.007	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	<10	-	-	-
DUP2_21_12_17_GME	BH211_GME	21-Dec-17	M17-De32021	<1	<2	<2	<2	<2	<2	0.004	<0.0001	0.004	0.007	0.009	<0.0001	0.011	0.029	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	-	-	-
Statistical Summary																																		
Number of Results				8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	6	6	6	6	6	6	6	6	6	6	6	8	6	6	6
Number of Detects				0	0	1	0	0	0	7	1	1	3	1	0	8	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration				<1	<1	<1	<2	<1	<2	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.0001	0.006	<0.005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Minimum Detect				ND	ND	14	ND	ND	ND	0.002	0.0005	0.004	0.002	0.009	ND	0.006	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration				<1	<2	14	<2	<2	<3	0.007	0.0005	0.004	0.007	0.009	<0.0001	0.16	0.62	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.05	<10	<0.05	<0.05	<0.05
Maximum Detect				ND	ND	14	ND	ND	ND	0.007	0.0005	0.004	0.007	0.009	ND	0.16	0.62	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration				0.5	0.56	2.3	1	0.56	1.4	0.0032	0.00014	0.00094	0.0018	0.0016	0.00005	0.043	0.11	0.025	0.025	0.025	0.025	0.005	0.025	0.025	0.025	0.000025	0.025	0.025	0.025	0.025	0.96	0.025	0.025	0.025
Median Concentration				0.5	0.5	0.5	1	0.5	1.5	0.003	0.0001	0.0005	0.0005	0.0005	0.00005	0.01	0.0285	0.025	0.025	0.025	0.025	0.005	0.025	0.025	0.025	0.000025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Standard Deviation				0	0.18	4.8	0	0.18	0.18	0.0019	0.00015	0.0012	0.0023	0.003	0	0.061	0.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	0	0	0
Number of Guideline Exceedances				0	0	0	0	0	0	0	0	0	3	1	0	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	3	1	0	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

				TRH										
				C6-C10 less BTEX (F1)	F2-NAPHTHALENE	C6 - C10	C10-C16	C16-C34	C34-C40	C6 - C9	C10 - C14	C15 - C28	C29 - C36	C10 - C36 (Sum of total)
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL				0.02	0.05	0.02	0.05	0.1	0.1	20	50	100	100	100
ANZECC 2000 Marine water 95%														
ANZECC 2000-Low Reliability Trigger Values for PAH in Marine 95%														
NEPM 2013 Commercial/industrial GW HSL D Vapour Intrusion, 2m to <4m, Sand				LOR										
NEPM 2013 GILs, Marine Waters(A)														
Field_ID	**LocCode**	**Sampled_Date-Time**	**SampleCode**											
BH102_GME	BH102	21-Dec-17	M17-De32014	<0.02	<0.05	<0.02	<0.05	<0.1	<0.1	<20	<50	<100	<100	<100
BH205_GME	BH205	21-Dec-17	M17-De32015	<0.02	<0.05	<0.02	<0.05	<0.1	<0.1	<20	<50	<100	<100	<100
BH211_GME	BH211	21-Dec-17	M17-De32016	<0.02	<0.05	<0.02	<0.05	<0.1	<0.1	<20	<50	<100	<100	<100
BH302_GME	BH302	21-Dec-17	M17-De32017	<0.02	<0.05	<0.02	<0.05	<0.1	<0.1	<20	<50	<100	<100	<100
BH307_GME	BH307	21-Dec-17	M17-De32018	<0.02	<0.05	0.03	<0.05	<0.1	<0.1	30	<50	<100	<100	<100
BH310_GME	BH310	21-Dec-17	M17-De32019	<0.02	<0.05	<0.02	<0.05	<0.1	<0.1	<20	<50	<100	<100	<100
DUP1_21_12_17_GME	BH211_GME	21-Dec-17	M17-De32021	<0.02	-	<0.02	-	-	-	<20	-	-	-	-
DUP2_21_12_17_GME	BH211_GME	21-Dec-17	M17-De32021	<0.02	-	<0.02	-	-	-	<20	-	-	-	-
Statistical Summary														
Number of Results				8	6	8	6	6	6	8	6	6	6	6
Number of Detects				0	0	1	0	0	0	1	0	0	0	0
Minimum Concentration				<0.02	<0.05	<0.02	<0.05	<0.1	<0.1	<20	<50	<100	<100	<100
Minimum Detect				ND	ND	0.03	ND	ND	ND	30	ND	ND	ND	ND
Maximum Concentration				<0.02	<0.05	0.03	<0.05	<0.1	<0.1	30	<50	<100	<100	<100
Maximum Detect				ND	ND	0.03	ND	ND	ND	30	ND	ND	ND	ND
Average Concentration				0.01	0.025	0.013	0.025	0.05	0.05	13	25	50	50	50
Median Concentration				0.01	0.025	0.01	0.025	0.05	0.05	10	25	50	50	50
Standard Deviation				0	0	0.0071	0	0	0	7.1	0	0	0	0
Number of Guideline Exceedances				0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	0	0

Concord Hospital
Table T5 - Groundwater QA/QC Results

Client: Johnstaff

	Lab Report Number		578955	578955		578955	Interlab_D			
	Field ID		BH211_GME	DUP1_21_12_17_GME	**RPD**	BH211_GME	Dup2_21_12_17_GME	**RPD**		
	Sampled Date/Time		21-12-17	21-12-17		21-12-17	21-12-17			
Chem_Gro	**ChemNam**	**Units**	**PQL**							
BTEX	Benzene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0	
	Ethylbenze	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0	
	Toluene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0	
	Xylene (m	µg/l	2	<2.0	<2.0	0	<2.0	<2.0	0	
	Xylene (o)	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0	
	Xylene Tot	µg/l	3	<3.0	<3.0	0	<3.0			
	C6-C10 les	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0	
Metals	Arsenic (Fi	mg/l	0.001	0.003	0.004	29	0.003	0.004	29	
	Cadmium (	mg/l	0.0002 (Primary): 0.0001	<0.0002	<0.0002	0	<0.0002	<0.0001	0	
	Chromium	mg/l	0.001	<0.001	<0.001	0	<0.001	0.004	120	
	Copper (Fi	mg/l	0.001	<0.001	<0.001	0	<0.001	0.007	150	
	Lead (Filte	mg/l	0.001	<0.001	<0.001	0	<0.001	0.009	160	
	Mercury (F	mg/l	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	
	Nickel (Filt	mg/l	0.001	0.007	0.007	0	0.007	0.011	44	
	Zinc (Filter	mg/l	0.005	<0.005	0.006	18	<0.005	0.029	141	
PAH	Naphthaler	µg/l	10 (Primary): 5 (Interlab)	<10.0			<10.0	<5.0	0	
	Naphthaler	µg/l	0.05 (Primary): 5 (Interla	<0.05			<0.05	<5.0	0	
TPH	C6 - C9	µg/l	20	<20.0	<20.0	0	<20.0	<20.0	0	
	C6 - C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0	

*RPDs have only been considered where a concentration is greater than 0 times the pQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 2000 (0-10 x PQL); 50 (10-20 x PQL); 30 (> 20 x PQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those use

			Lab Report Number	578955	578955	578955
			Field ID	R1_21_12_17_GME	TB1_21_12_17_GME	TS1_21_12_17_GME
			Sampled_Date/Time	21-12-17	21-12-17	21-12-17
			Sample Type	Rinsate	Trip_B	Trip_S
Chem_Group	**ChemName**	**Units**	**EQL**			
BTEX	Benzene	µg/L	1	<1	<1	96%
	Ethylbenzene	µg/L	1	<1	<1	87%
	Toluene	µg/L	1	<1	<1	90%
	Total BTEX	mg/l	0.001			
	Xylene (m & p)	µg/l	2	<2	<2	86%
	Xylene (o)	µg/l	1	<1	<1	88%
	Xylene Total	µg/l	3	<3	<3	87%
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02		
Metals	Arsenic	mg/l	0.001	<0.001		
	Arsenic (Filtered)	mg/l	0.001			
	Cadmium	mg/l	0.0002	<0.0002		
	Cadmium (Filtered)	mg/l	0.0001			
	Chromium	mg/l	0.001	<0.001		
	Chromium (Filtered)	mg/l	0.001			
	Copper	mg/l	0.001	<0.001		
	Copper (Filtered)	mg/l	0.001			
	Lead	mg/l	0.001	<0.001		
	Lead (Filtered)	mg/l	0.001			
	Mercury	mg/l	0.0001	<0.0001		
	Mercury (Filtered)	mg/l	0.0001			
	Nickel	mg/l	0.001	<0.001		
	Nickel (Filtered)	mg/l	0.001			
	Zinc	mg/l	0.005	<0.005		
	Zinc (Filtered)	mg/l	0.005			
PAH	Acenaphthene	µg/l	0.05			
	Acenaphthylene	µg/l	0.05			
	Anthracene	µg/l	0.05			
	Benzo(a)anthracene	µg/l	0.05			
	Benzo(a)pyrene	µg/l	0.01			
	Benzo(g,h,i)perylene	µg/l	0.05			
	Benzo(k)fluoranthene	µg/l	0.05			
	Chrysene	µg/l	0.05			
	Benzo[b+j]fluoranthene	mg/l	0.00005			
	Dibenz(a,h)anthracene	µg/l	0.05			
	Fluoranthene	µg/l	0.05			
	Fluorene	µg/l	0.05			
	Indeno(1,2,3-c,d)pyrene	µg/l	0.05			
	Naphthalene	µg/l	0.05	<10		
	Phenanthrene	µg/l	0.05			
	Pyrene	µg/l	0.05			
	Total PAHs	µg/l	0.05			
TRH	F2-NAPHTHALENE	mg/l	0.05			
	C6 - C9	µg/l	20	<20	<20	110%
	C10 - C14	µg/l	50			
	C15 - C28	µg/l	100			
	C29 - C36	µg/l	100			
	C10 - C36 (Sum of total)	µg/l	100			
	C10-C16	mg/l	0.05			
	C16-C34	mg/l	0.1			
	C34-C40	mg/l	0.1			
	C6 - C10	mg/l	0.02	<0.02		
TRH Volatiles/BTEX	Total Xylenes	µg/L	2			

Appendix A – Data Quality Objectives

Data Quality Objectives

Step 1 - State the Problem

Concord Hospital is proposing redevelop portions of the site which will comprise the demolition of older structures located within the Phase 1 investigation area, and construction of new hospital buildings.

DP undertook a PSI and targeted sampling assessment in 2016 (DP 2016) which concluded that there was a potential for contamination to exist at the site associated with a suspected UST situated in the loading dock area.

Step 2 - Identify the Decisions

The decisions to be made based on the results of the investigation were as follows:

- What are the CoPC associated with potential soil contamination?
- Are CoPC present within soil, and if so, do they present an unacceptable risk to human health or the environment for the proposed redevelopment of the site?
- If soil contamination is present, does the site require remediation works and/or a management plan prior to the commencement of the construction phase of works?

Step 3 - Identify Inputs in the Decision

The inputs required to make the above decisions were as follows:

- Site setting and available background information;
- Selection of appropriate Tier 1 soil assessment criteria;
- Visual observations; and
- Field and laboratory analytical results.

Step 4 - Define Boundaries of the Study

The boundaries of the investigation were identified as follows:

- The geographical limits appropriate for the data collection and decision making in this investigation comprised the boundary of the Phase 1 work area as shown on Figure 2 in the 'Figures' section of this report.
- Temporal boundaries: The current status of the sampling points at the time of the investigation.
- Constraints within the study boundary: Constraints to the investigation are outlined in Section 10 of this report.

Step 5 - Develop a Decision Rule

The purpose of this step was to define the parameter of interest, specify the action level and combine the outputs of the previous DQO steps into an 'if/then' decision rule that defines the conditions that would cause the decision maker to choose alternative actions.

If the levels of contaminants of potential concern in soil were below the adopted soil assessment criteria, the risk to human health and the environment could be considered to be low for that land use.

If concentrations of contaminants in soil exceed the adopted soil assessment criteria, consideration for statistical analysis of the dataset should be undertaken to support the need or otherwise for further assessment, remediation or site management. These decision rules include the 95% upper confidence limit (UCL) of the mean contaminant concentration being less than the adopted site assessment criteria, the standard deviation being less than 50% and no individual concentration being in excess of 250% of the site assessment criteria (for similar soil types).

The spatial extent of data should be considered to assess whether additional data gaps require investigation.

If the quality control (QC) results meet the data quality indicators (DQI), then the analytical data is considered suitable and reliable for the purpose of this contamination investigation.

Step 6 - Specify Limits on Decision Errors

There are two types of decision errors:

- Sampling errors, which occur when the samples collected are not representative of the conditions within the investigation area; and
- Measurement errors, which occur during sample collection, handling, preparation, analysis and data reduction.

The null hypothesis, which is an assumption assumed to be true in the absence of contrary evidence, for this study is 'The site is contaminated and thus not suitable for use'.

These errors may lead to the following decision errors:

- Type I error - Rejecting the hypothesis as false when it is really true: Deciding that contamination is not present when the reverse is true; and
- Type II error - Accepting the hypothesis as true when it is really false: Deciding that contamination is present when the reverse is true.

An assessment will be made as to the likelihood of a decision error being made based on the results of a QA/QC assessment and the closeness of the data to assessment criteria. Additionally, statistical methods such as 95% Upper Confidence Limit (UCL) calculations may be utilised, where applicable.

The acceptable limits on decision errors applied during this investigation and the manner of addressing possible decision errors were developed based on the data quality indicators (DQIs) of:

- Accuracy: a quantitative measure of the closeness of reported data to the true value;
- Comparability: a qualitative parameter expressing the confidence with which one (1) data set can be compared with another;
- Completeness: a measure of the amount of useable data (expressed as %) from a data collection activity;

Step 7 - Optimise the Design

The purpose of this step was to identify a resource-effective data collection design for generating data that satisfies the DQOs.

This assessment was designed considering the information provided during the request for proposal.

A proposal was prepared for the DSI which outlined a proposed scope. The methodology within the proposal was reviewed at critical times during the project and amended where necessary based on site conditions, unexpected finds, professional judgement and liaison with Johnstaff. The methodology adopted to satisfy the DQOs is described in detail in Section 10.

To ensure the design satisfied the DQOs, DQIs (for accuracy, comparability, completeness, precision and reproducibility) were established to set acceptance limits on field methodologies and laboratory data collected.

Appendix B – Data Quality Indicators

A summary of the field and laboratory DQIs for the DSI are provided in Table B1.

Table B1: Data Quality Indicators (DQIs)

Field Considerations	Laboratory Considerations	Comments
	Accuracy (bias)	
Work instructions (WI) are appropriate and have been complied with.	Analysis of: • Trip blanks; • Rinsate blanks; • Reagent blanks; • Method blanks; • Matrix spikes; • Surrogate spikes; • Reference material; • Laboratory control samples; and • Laboratory-prepared spikes.	Bias introduced: • By chemicals during handling or transport; • From contaminated equipment; • From contaminated reagent; • During laboratory analysis; • During laboratory preparation and analysis (may be high or low); • During laboratory preparation and analysis (may be high or low); • Precision of preparation of analytical method; • Precision of preparation of analytical method; and • During collection/transport (may be high or low).
	Comparability	
Same WIs used on each occasion. **Experienced sampler.** **Climatic conditions (temperature, rainfall, wind).** **Same types of samples collected (filtered, size fractions).**	Sample analytical methods used (including clean-up). Laboratory practical quantification limits (PQLs) (justify /quantify if different). Same laboratories (justify /quantify if different). Same units (justify /quantify if different).	Same approach to sampling (WIs, holding times). Quantify influence from climatic or physical conditions. Samples collected, preserved, handled in same manner (filtered, same containers).

Table B1: Data Quality Indicators (DQIs)

Field Considerations	Laboratory Considerations	Comments
	Completeness	
Critical locations sampled. **WIs appropriate and complied with.** **Experienced sampler.** **Documentation correct.**	Critical samples analysed in accordance with the tender response. Analytes sampled in accordance with scope of works. Appropriate methods and PQLs. Sample documentation correct. Sample holding times complied with.	The required percentage completeness should be specified in the scope of works. Required data must be obtained from critical samples and CoPC. Incompleteness is influenced by: • Field performance problems (access problems, difficulties on site, damage); • Laboratory performance problems (Matrix interference, invalid holding times); and • Matrix problems.
	Representativeness	
Appropriate media sampled according to the scope of works. **Media in the scope of works sampled.**	Samples analysed according to the tender response.	Samples must be collected to reflect characteristics of each medium. Sample analysis must reflect properties of field samples. Homogeneity of the samples. Appropriate collection, handling, storage and preservation. Detection of laboratory artefacts, e.g. contamination blanks.
	Precision	
WIs appropriate and complied with.	Analysis of: • Laboratory and inter-laboratory duplicates; • Laboratory prepared trip spikes; and • Field duplicates.	Measured by the coefficient of variance or standard deviation of the mean or Relative Percentage. Field duplicates measure field and laboratory precision Difference (RPD) calculations. Variation in RPDs can be expected to be higher for organics, low concentrations (<5 x laboratory PQL) or non-homogenous samples.

Acceptable limits adopted for data quality indicators for this DSI are outlined in Table B2.

Table B2: Acceptable Limits of Data Quality Indicators

Item	Acceptable Limit
Analysis of blind (intra-laboratory) duplicates and split (inter-laboratory) duplicates	Rate of 1:20 primary samples for the same analysis of primary samples; Calculation of relative percentage differences between primary and duplicate samples, the results of which to be less than: • 80% (where the average concentration was 1-10 x laboratory PQL); • 50% (where the average concentration was 10-30 x laboratory PQL); and • 30% (where the average concentration was > 30 x laboratory PQL).
Analysis of rinsate blanks	Rate of one (1) sample per batch; and Results less than the laboratory PQL.
Analysis of trip blanks	Rate of one (1) sample per batch; and Results less than the laboratory PQL.
Analysis of trip spikes	Rate of one (1) sample per batch; and Results between 70%-130%.
Analysis of laboratory blanks, spikes, surrogates, reference and control samples	Laboratory specific
Laboratories and methods used	National Association of Testing Authorities accredited.
Sample PQLs	Results less than the adopted assessment criteria; justify/quantify if different.

Appendix C – Photographs

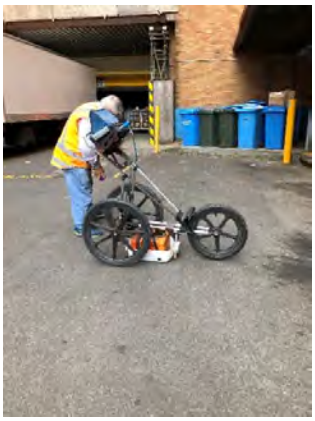


Photo 1. Service locator using GPR conducting survey to identify suspected underground storage tank.

Photo 2. Looking south across loading dock with concrete cuts noted running parallel with loading dock access road.

Photo 3. Loading dock area, looking south at suspected interceptor trap or grease trap.

Photo 4. Looking south-west across Phase 1 investigation area towards the tennis courts with construction area noted on left side of photo.

Photo 5. Looking north-west across the southern extent of the Phase 1 investigation area.

Photo 6. Looking north-east across Phase 1 investigation area.

Appendix D – Assessment Criteria

Soil Health Investigation Levels (HILs)

HILs relevant to commercial/industrial land use were adopted from ASC NEPM 2013.

HILs are deemed applicable for assessing human health risk via all relevant exposure pathways of exposure for metals and organic substances. HILs are concentrations below which contaminants in soils are not considered to adversely affect human health. The adopted HILs for assessment of soil are presented in Table T1.

Soil Health Screening Levels (HSLs)

Soil HSLs are provided in ASC NEPM 2013 for selected petroleum compounds and fractions and are considered applicable to assessing human health risk via vapour intrusion and inhalation. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures. They apply to different soil types, and depths below surface to >4m bgl.

Soil HSLs were also adopted from CRCCARE 2011 to assess the exposure pathway of:

- Direct contact (oral ingestion, dermal contact and dust inhalation) for commercial / industrial workers and intrusive maintenance workers; and
- Vapour intrusion for intrusive maintenance workers (maximum trench depth of 1.0 m).

As a conservative approach, a sandy soil type and depth of 0 - 1 m was adopted. Workers working in deeper excavations are anticipated to have their own management plan as part of the work, health and safety procedures.

The soil HSLs adopted are presented in Table T1.

Petroleum Hydrocarbon Management Limits

Petroleum hydrocarbon management limits provided in ASC NEPM 2013 were considered applicable for assessing petroleum hydrocarbons in soil to avoid or minimise the following potential effects of petroleum hydrocarbon contamination:

- Formation of observable light non-aqueous phase liquid (LNAPL);
- Fire and explosion hazards;
- Effects on buried infrastructure (i.e. penetration of, or damage to, in-ground services by hydrocarbons); and
- Aesthetics.

Management limits for a commercial/industrial land use with coarse soil texture were adopted for this assessment are presented in Table T1.

Groundwater Investigation Levels (GILs)

Groundwater investigation levels (GILs) for protection of marine aquatic ecosystems (95% protection level) have been adopted from ASC NEPM 2013 as they are considered applicable for assessing ecological risks to aquatic ecosystems from direct uptake with CoPC in groundwater.

GILs for marine aquatic ecosystems are defined as the concentrations of a contaminant in groundwater above which further investigation or a response should be undertaken and are based on AWQG 2000 (ANZECC 2000). The GILs define acceptable water quality for various contaminants at the point of use.

The adopted GILs for assessment of marine aquatic ecosystems are presented in Table T4.

Low Reliability Trigger Values

Where GILs are not provided in ASC NEPM 2013, low reliability trigger values were adopted from ANZECC 2000 for protection of marine ecosystems as interim working levels. The low reliability trigger values adopted are presented in Table T4.

Groundwater Health Screening Levels (HSLs)

Groundwater HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the vapour intrusion pathway. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures. They apply to different soil types, and depths below 2 m to 4 mBGL. Based on site conditions encountered during drilling, a sandy soil type was adopted for assessment purposes. Based on depth to groundwater and taking into account seasonal fluctuations, a depth of 2 m to 4 mBGL was adopted.

The adopted groundwater HSLs for vapour intrusion are presented in Table T4.

Appendix E – Borehole & Well Construction Logs

coffey
A TETRA TECH COMPANY

Engineering Log - Borehole

Borehole ID.	**BH101**
sheet:	1 of 2
project no.	**SYDGE211253**
client:	**Health Infrastructure**
date started:	**23 Nov 2017**
principal:	
date completed:	**23 Nov 2017**
project:	**Concord Hospital Phase 1 Redevelopment**
logged by:	**TW/JJ**
location:	**Hospital Road, Concord, NSW**
checked by:	**DS**

position: E: 323,541.05; N: 6,254,221.55 (MGA94) | surface elevation: 8.60 m (AHD) | angle from horizontal: 90°

drill model: Hanjin DB8, Track mounted | drilling fluid: | hole diameter : 125 mm

drilling information | **material substance**

method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD/T CASING	1 2 3	Not Encountered	SPT 23, 5 HB N*=R	8	1.0			**ASPHALT**: 50mm.	D			**ASPHALT**
								FILL: Gravelly SAND: fine to medium grained, dark brown, gravel fine to medium grained, sub-angular to sub-rounded.	<Wp			**FILL**
												E Sample PID = 1.4ppm
												E Sample PID = 1.5ppm
								FILL: Gravelly CLAY: medium to high plasticity, dark grey, fine grained gravel, sub-rounded to rounded, with trace of sand.				No staining or odour
				7	2.0			Borehole BH101 continued as cored hole				
				6	3.0							
				5	4.0							
				4	5.0							
				3	6.0							
				2	7.0							
				1								

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

coffey
A TETRA TECH COMPANY

Engineering Log - Cored Borehole

Borehole ID.	**BH101**
sheet:	2 of 2
project no.	**SYDGE211253**
client:	**Health Infrastructure**
date started:	**23 Nov 2017**
principal:	
date completed:	**23 Nov 2017**
project:	**Concord Hospital Phase 1 Redevelopment**
logged by:	**TW/JJ**
location:	**Hospital Road, Concord, NSW**
checked by:	**DS**

position: E: 323,541.05; N: 6,254,221.55 (MGA94) surface elevation: 8.60 m (AHD) angle from horizontal: 90°

drill model: Hanjin DB8, Track mounted drilling fluid: hole diameter : 125 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
		8									
			1.0		start coring at 1.00m						
NMLC	Not Encountered	7			**SHALE**: dark grey, brown, iron stained along bedding at 0°.	MW - SW			0%		E Sample PID = 3.0ppm
					NO CORE: 0.11 m	MW - SW		a=0.68 d=0.61			
					SHALE: dark grey, brown, iron stained along bedding at 0°.						Highly fractured zone
					NO CORE: 0.05 m	MW - SW					
		6	2.0		**SHALE**: dark grey, brown, iron stained along bedding at 0°.	SW		a=1.21 d=0.90	0%		
					2.69 m: becoming less iron stained	FR		a=1.55 d=0.95			PT, 30°, PL, RO, CN SM, 0°, PL, RO, Clay, 10 mm, XW PT, IR, RO, CN
		5	3.0								JT, 60 - 90°, IR, RO, SN - Fe
		4	4.0					a=1.55 d=0.11	90%		PT, 0°, CU, RO, CN
			5.0								JT, 30°, PL, RO, CN
		3						a=1.21 d=0.19			
			6.0		Borehole BH101 terminated at 5.97 m Refusal						
		2									
			7.0								
		1									

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

CDF_0_9_06_LIBRARY.GLB rev:AR Log COF BOREHOLE: CORED 754-SYDGE211253.GPJ <<DrawingFile>> 22/01/2018 11:50

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

coffey
A TETRA TECH COMPANY

Piezometer Installation Log

Hole ID.	**BH101**
sheet:	1 of 1
project no.	**SYDGE211253**
client:	**Health Infrastructure**
principal:	
project:	**Concord Hospital Phase 1 Redevelopment**
location:	**Hospital Road, Concord, NSW**
date started:	**23 Nov 2017**
date completed:	**23 Nov 2017**
logged by:	**TW/JJ**
checked by:	**DS**

position: E: 323,541.05; N: 6,254,221.55 (MGA94) | surface elevation: 8.60 m (AHD) | angle from horizontal: 90°

equipment type: Hanjin DB8, Track mounted | drilling fluid: | hole diameter : 125 mm

drilling information | **material substance** | **piezometer construction details**

method & support | water | RL (m) | depth (m) | graphic log | material name

AD/T
CASING
NMLC
Not Encountered

RL: 8, 7, 6, 5, 4, 3, 2, 1
depth: 1, 2, 3, 4, 5, 6, 7

ASPHALT
FILL

BH101

bore construction license:
drilling company:
driller:
driller's permit no.:

Grout
1.50 m
Bentonite
2.00 m
3.00 m
Sand
5.97 m

method & support
see engineering log for details

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

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

ID	type	installation date	stickup (m)	tip depth (m)	water level (m)	Relative Levels (AHD) stickup	tip	water level
BH101	standpipe piezo.			5.97 m			2.63	

CDF_0_9_06_LIBRARY.GLB rev:AU Log COF PIEZOMETER ONE PAGE SUMMARY 754-SYDGE211253.GPJ <<DrawingFile>> 15/01/2018 09:05

coffey
A TETRA TECH COMPANY

Engineering Log - Borehole

Borehole ID.	**BH102**
sheet:	1 of 2
project no.	**SYDGE211253**
date started:	**14 Dec 2017**
date completed:	**14 Dec 2017**
logged by:	**AM**
checked by:	**DS**

client: ***Health Infrastructure***

principal:

project: ***Concord Hospital Phase 1 Redevelopment***

location: ***Hospital Road, Concord, NSW***

position: E: 323,559.02; N: 6,254,200.12 (MGA94) | surface elevation: 8.30 m (AHD) | angle from horizontal: 90°

drill model: Hanjin DB8, Track mounted | drilling fluid: | hole diameter : 125 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 / AD/T — CASING			SPT 16, 18 HB N*=R	8 / 7	1.0			**ASPHALT**: 50mm.	D			**ASPHALT**
								FILL: Sandy SILT: fine to coarse grained, low liquid limit, yellow-brown, trace of gravel.				**FILL** E Sample PID = 4.1ppm No odours or staining
							CL	**Silty CLAY**: low plasticity, pale yellow-brown.	<Wp	VSt - H		**RESIDUAL SOIL**
								SHALE: yellow-brown, dark red, extremely weathered, very low strength.				E Sample PID = 0.8ppm **WEATHERED BEDROCK**
				6	2.0			Borehole BH102 continued as cored hole				
				5	3.0							
				4	4.0							
				3	5.0							
				2	6.0							
				1	7.0							

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

CDF_0_9_06_LIBRARY.GLB rev:AU Log COF BOREHOLE: NON CORED 754-SYDGE211253.GPJ <<DrawingFile>> 15/01/2018 08:50

coffey
A TETRA TECH COMPANY

Engineering Log - Cored Borehole

Borehole ID.	**BH102**
sheet:	2 of 2
project no.	**SYDGE211253**
client:	**Health Infrastructure**
date started:	**14 Dec 2017**
principal:	
date completed:	**14 Dec 2017**
project:	**Concord Hospital Phase 1 Redevelopment**
logged by:	**AM**
location:	**Hospital Road, Concord, NSW**
checked by:	**DS**

position: E: 323,559.02; N: 6,254,200.12 (MGA94) surface elevation: 8.30 m (AHD) angle from horizontal: 90°

drill model: Hanjin DB8, Track mounted drilling fluid: hole diameter : 125 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
		8									
			1.0		start coring at 1.50m						
		7			**NO CORE:** 0.30 m						
NMLC	21/12/17	6	2.0		**SHALE**: dark grey, with orange-brown iron staining, laminated at 5°-10°, with frequent clay seams parallel to bedding.	MW - SW		a=0.40 d=0.47	9%		PT, 5 - 10°, PL, RO, CN JT, 10°, IR, RO, CN SM, Clay, closed JT, 25°, CU, RO, CN PT, 10°, IR, RO, CN Drilling Break, 10°, CU - PL, RO SM, Clay, closed Drilling Break, 5°, PL, RO, CN
		5	3.0					a=0.44 d=0.10			JT, 10°, PL, RO, CN Drilling Break, 5°, PL, RO, CN
		4	4.0			SW		a=0.41 d=0.18 a=0.73 d=0.24	36%		JT, 35°, PL, RO, CN JT, 15°, PL, RO, CN
		3	5.0		**SHALE**: dark grey, thickly bedded.	FR		a=1.34 d=0.49 a=1.01 d=0.96			JT, 10°, PL, RO, CN JT, 10°, CU, RO, CN PT, 5 - 10°, PL, RO, CN SZ, RO, CN
		2	6.0					a=0.66 d=0.65			JT, 40°, PL, RO, CN
		1	7.0					a=0.76 d=0.70	90%		JT, 35°, PL, RO, CN JT, 35°, PL, RO, CN
					Borehole BH102 terminated at 8.00 m			a=0.61 d=0.45			Drilling Break, 30°, IR, RO, CN JT, 35°, PL, RO, CN

CDF_0_9_06_LIBRARY.GLB rev:AR Log COF BOREHOLE: CORED 754-SYDGE211253.GPJ <<DrawingFile>> 22/01/2018 11:50

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

coffey
A TETRA TECH COMPANY

Piezometer Installation Log

Hole ID.	**BH102**
sheet:	1 of 1
project no.	**SYDGE211253**
client:	**Health Infrastructure**
principal:	
project:	**Concord Hospital Phase 1 Redevelopment**
location:	**Hospital Road, Concord, NSW**
date started:	**14 Dec 2017**
date completed:	**14 Dec 2017**
logged by:	**AM**
checked by:	**DS**

position: E: 323,559.02; N: 6,254,200.12 (MGA94) | surface elevation: 8.30 m (AHD) | angle from horizontal: 90°

equipment type: Hanjin DB8, Track mounted | drilling fluid: | hole diameter : 125 mm

drilling information | **material substance** | **piezometer construction details**

method & support | water | RL (m) | depth (m) | graphic log | material name

HA | AD/T | CASING | NMLC

21/12/17

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

1 | 2 | 3 | 4 | 5 | 6 | 7

ASPHALT

FILL

RESIDUAL SOIL

WEATHERED BEDROCK

Borehole BH102 terminated at 8.00 m

BH102

bore construction license:
drilling company:
driller:
driller's permit no.:

Grout

3.50 m

Bentonite

4.00 m

5.00 m

Sand

8.00 m

CDF_0_9_06_LIBRARY.GLB rev:AU Log COF PIEZOMETER ONE PAGE SUMMARY 754-SYDGE211253.GPJ <<DrawingFile>> 15/01/2018 09:05

method & support
see engineering log for details

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

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

ID	type	installation date	stickup (m)	tip depth (m)	water level (m)	Relative Levels (AHD) stickup	tip	water level
BH102	standpipe piezo.			8.00 m			0.30	

Appendix F – Laboratory Reports

3 day — 576600 13.6°C
Recv 8/12/17
11:43AM

coffey

Chain of Custody

No. 48944

SYR211253

Hand Truck
24/11/17
18:15

					Suite 84	Suite H8	Suite 315	Asbestos (50g)
AUGER	SOIL	JAR + BAG	BH101 0.05-0.1	23/11/17				
AUGER		JAR + BAG	BH101 0.5-0.65	23/11/17	✓	✓	✓	✓
SPT		JAR + BAG	BH101 1.0-1.11	23/11/17	✓	✓		
AUGER		JAR + BAG	BH102A 0.05-0.1	23/11/17				
AUGER			BH204A 0.05-0.1	23/11/17	✓	✓	✓	✓
AUGER			BH204A 0.5	23/11/17				
AUGER			BH205 0.05-0.1	24/11/17	✓	✓	✓	✓
AUGER			BH205 0.6	24/11/17	✓	✓		
SPT			BH205 1.0-1.45	24/11/17				
SPT			BH205 2.0-2.26	24/11/17				
AUGER			BH204B 0.8	24/11/17				
SPT			BH204B 1.0-1.45	24/11/17	✓	✓		
SPT			BH204B 2.0-2.24	24/11/17				
AUGER		BAG	BH202 0.3-0.5	22/11/17	✓	✓	✓	✓

Samples BH101-0.5-0.65 on 3 DAY TAT
BH101-1.0-1.11

Remaining samples on standard TAT

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1 110351

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Consigning Office: Coffey Chatswood
Report Results to: Matt Locke / Simon Hay
Invoices to: Delfa Sarabia Delfa.Sarabia@coffey.com
Mobile: 0424 703 009
Phone:
Email: Simon.hay @coffey.com
Email: Matthew.locke @coffey.com

Project No: SYDGE 211253
Project Name: Concord
Sampler's Name: Aiden Mckenzie
Special Instructions:

Task No: Fieldwork
Laboratory: MGT - Eurofins
Project Manager: Delfa Sarabia

Analysis Request Section

577580

NOTES

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B4 - PAH/TRH/BTEX	Suite B8 - Metals 8	Suite B13 - OCP/PCB	BTEX, TRH C6-C10	Hold
	BH102/0.05 - 0.2	14.12.17		soil	Jar	Standard	✓	✓	✓		✓
	BH102/0.5 - 0.7	"		soil	Jar	"					
	BH102/1.1 - 1.3	"		soil	Jar	"	✓	✓			
	R1_14.12.17	14.12.17		water	amber/viol	standard	✓	✓			
	Dup1-14.12.17	"		soil	jar	standard	✓	✓			
1	Dup 2 - 14.12.17	"		"	"	"	✓	✓			
	TS1 - 14.12.17	"		water	viol	standard			✓		

Please forward to ALS

Environmental Division
Sydney
Work Order Reference
ES1732034

Telephone : +61-2-8784 8555

RELINQUISHED BY		RECEIVED BY	
Name: Simon Hay	Date: 14.12.17	Name: Mona	Date: 14/12/17
Company: Coffey Environments	Time: 4:00	Company: Eftmgt	Time: 17:50
Name:	Date:	Name: ANDREW	Date: 15/12/17
Company:	Time:	Company: ALS	Time: 12:00pm

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved in Good Condition ☐
All Documentation is in Proper Order 11.5 ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No. 577580

*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, OP - Other Preservative

Melbourne
3-5 Kingston Town Close
Oakleigh Vic 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

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

Sample Receipt Advice

Company name:	**Coffey Environments Pty Ltd NSW**
Contact name:	Matthew Locke
Project name:	SOIL ANALYSIS
Project ID:	SYDGE211253
COC number:	Not provided
Turn around time:	3 Day
Date/Time received:	Dec 8, 2017 11:43 AM
Eurofins | mgt reference:	**576600**

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 : 13.6 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.

☒ Split sample sent to requested external lab.

☒ 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:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

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 Environments Pty Ltd NSW email address.

eurofins | mgt

30 years Testing For Life 1987–2017
Celebrating 30 years Testing and Protecting Human Health

Certificate of Analysis

Coffey Environments Pty Ltd NSW
Level 20, 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 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Matthew Locke**

Report **576600-S**
Project name SOIL ANALYSIS
Project ID SYDGE211253
Received Date Dec 08, 2017

Client Sample ID			**BH101_0.5-0.65**	**BH101_1.0-1.11**
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**S17-De12290**	**S17-De12291**
Date Sampled			**Nov 23, 2017**	**Nov 23, 2017**
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	%	82	78
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	50	mg/kg	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
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

Client Sample ID			BH101_0.5-0.65	BH101_1.0-1.11
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**S17-De12290**	**S17-De12291**
Date Sampled			**Nov 23, 2017**	**Nov 23, 2017**
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
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
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	%	INT	INT
p-Terphenyl-d14 (surr.)	1	%	96	54
Heavy Metals				
Arsenic	2	mg/kg	2.5	8.0
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	9.4
Copper	5	mg/kg	11	30
Lead	5	mg/kg	16	30
Mercury	0.1	mg/kg	0.2	< 0.1
Nickel	5	mg/kg	< 5	31
Zinc	5	mg/kg	18	120
% Moisture	1	%	11	6.9

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	Dec 11, 2017	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Dec 11, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 11, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 11, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 11, 2017	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soils by GCMS			
Metals M8	Sydney	Dec 11, 2017	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Dec 08, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

eurofins | mgt

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

Melbourne
2-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**		**Received:**	Dec 8, 2017 11:43 AM
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	576600	**Due:**	Dec 13, 2017
		Phone:	+61 2 9406 1000	**Priority:**	3 Day
		Fax:	+61 2 9406 1004	**Contact Name:**	Matthew Locke
Project Name:	SOIL ANALYSIS				
Project ID:	SYDGE211253				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	Metals M8	Moisture Set	Eurofins | mgt Suite B4
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	BH101_0.5-0.65	Nov 23, 2017		Soil	S17-De12290	X	X	X	X
2	BH101_1.0-1.11	Nov 23, 2017		Soil	S17-De12291		X	X	X
Test Counts						1	2	2	2

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. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. 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

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

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 and 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.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
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 & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

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	
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							
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							
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	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	89			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	%	77			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	78			70-130	Pass	
Toluene	%	81			70-130	Pass	
Ethylbenzene	%	83			70-130	Pass	
m&p-Xylenes	%	86			70-130	Pass	
o-Xylene	%	88			70-130	Pass	
Xylenes - Total	%	87			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	86			70-130	Pass	
TRH C6-C10	%	87			70-130	Pass	
TRH >C10-C16	%	81			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	73			70-130	Pass	
Acenaphthylene	%	77			70-130	Pass	
Anthracene	%	84			70-130	Pass	
Benz(a)anthracene	%	84			70-130	Pass	
Benzo(a)pyrene	%	75			70-130	Pass	
Benzo(b&j)fluoranthene	%	95			70-130	Pass	
Benzo(g.h.i)perylene	%	100			70-130	Pass	
Benzo(k)fluoranthene	%	72			70-130	Pass	
Chrysene	%	79			70-130	Pass	
Dibenz(a.h)anthracene	%	115			70-130	Pass	
Fluoranthene	%	80			70-130	Pass	
Fluorene	%	78			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	86			70-130	Pass	
Naphthalene	%	72			70-130	Pass	
Phenanthrene	%	83			70-130	Pass	
Pyrene	%	82			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	86			70-130	Pass	
Cadmium	%	88			70-130	Pass	
Chromium	%	105			70-130	Pass	
Copper	%	103			70-130	Pass	
Lead	%	99			70-130	Pass	
Mercury	%	97			70-130	Pass	
Nickel	%	95			70-130	Pass	
Zinc	%	99			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	S17-De14365	NCP	%	83			70-130	Pass	
TRH C10-C14	S17-De11176	NCP	%	83			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S17-De14365	NCP	%	74			70-130	Pass	
Toluene	S17-De14365	NCP	%	73			70-130	Pass	
Ethylbenzene	S17-De14365	NCP	%	73			70-130	Pass	
m&p-Xylenes	S17-De14365	NCP	%	76			70-130	Pass	
o-Xylene	S17-De14365	NCP	%	78			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Xylenes - Total	S17-De14365	NCP	%	77			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S17-De14365	NCP	%	72			70-130	Pass	
TRH C6-C10	S17-De14365	NCP	%	85			70-130	Pass	
TRH >C10-C16	S17-De11176	NCP	%	85			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S17-De07917	NCP	%	72			70-130	Pass	
Acenaphthylene	S17-De16130	NCP	%	92			70-130	Pass	
Anthracene	S17-De16130	NCP	%	91			70-130	Pass	
Benz(a)anthracene	S17-De07917	NCP	%	94			70-130	Pass	
Benzo(a)pyrene	S17-De07917	NCP	%	87			70-130	Pass	
Benzo(b&j)fluoranthene	S17-De07917	NCP	%	105			70-130	Pass	
Benzo(g.h.i)perylene	S17-De07917	NCP	%	75			70-130	Pass	
Benzo(k)fluoranthene	S17-De07917	NCP	%	88			70-130	Pass	
Chrysene	S17-De07917	NCP	%	88			70-130	Pass	
Dibenz(a.h)anthracene	S17-De07917	NCP	%	80			70-130	Pass	
Fluoranthene	S17-De07917	NCP	%	90			70-130	Pass	
Fluorene	S17-De16130	NCP	%	99			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S17-De07917	NCP	%	72			70-130	Pass	
Naphthalene	S17-De16130	NCP	%	89			70-130	Pass	
Phenanthrene	S17-De16130	NCP	%	90			70-130	Pass	
Pyrene	S17-De07917	NCP	%	90			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S17-De12142	NCP	%	107			70-130	Pass	
Cadmium	S17-De12142	NCP	%	112			70-130	Pass	
Chromium	S17-De12142	NCP	%	108			70-130	Pass	
Copper	S17-De12142	NCP	%	101			70-130	Pass	
Lead	S17-De12142	NCP	%	122			70-130	Pass	
Mercury	S17-De12142	NCP	%	119			70-130	Pass	
Nickel	S17-De12142	NCP	%	97			70-130	Pass	
Zinc	S17-De12142	NCP	%	96			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	S17-De14364	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S17-De14364	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S17-De14364	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S17-De14364	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S17-De14364	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S17-De14364	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S17-De14364	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S17-De14364	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S17-De14364	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S17-De14364	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S17-De14364	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S17-De14364	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S17-De14364	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S17-De14364	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S17-De14364	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S17-De16171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S17-De16171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S17-De16171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S17-De16171	NCP	mg/kg	1.0	1.1	12	30%	Pass	
Benzo(a)pyrene	S17-De16171	NCP	mg/kg	1.0	1.1	15	30%	Pass	
Benzo(b&j)fluoranthene	S17-De16171	NCP	mg/kg	1.3	1.6	17	30%	Pass	
Benzo(g.h.i)perylene	S17-De16171	NCP	mg/kg	0.7	0.8	18	30%	Pass	
Benzo(k)fluoranthene	S17-De16171	NCP	mg/kg	< 0.5	0.6	34	30%	Fail	Q15
Chrysene	S17-De16171	NCP	mg/kg	0.7	0.9	20	30%	Pass	
Dibenz(a.h)anthracene	S17-De16171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S17-De16171	NCP	mg/kg	1.2	1.4	18	30%	Pass	
Fluorene	S17-De16171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S17-De16171	NCP	mg/kg	0.7	0.8	13	30%	Pass	
Naphthalene	S17-De16171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S17-De16171	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S17-De16171	NCP	mg/kg	1.2	1.5	23	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S17-De12141	NCP	mg/kg	6.9	7.1	3.0	30%	Pass	
Cadmium	S17-De12141	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S17-De12141	NCP	mg/kg	39	42	9.0	30%	Pass	
Copper	S17-De12141	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S17-De12141	NCP	mg/kg	12	13	11	30%	Pass	
Mercury	S17-De12141	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S17-De12141	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S17-De12141	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S17-De12291	CP	%	6.9	7.1	2.0	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

Comments

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

Nibha Vaidya	Analytical Services Manager
Nibha Vaidya	Senior Analyst-Asbestos (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

Measurement uncertainty of test data is available on request or please click here.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1 110351

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Consigning Office:	Coffey Chatswood				
Report Results to:	Matt Locke / Simon Hay	Mobile:	0424 703 009	Email:	simon.hay @coffey.com
Invoices to:	Delfa Sarabia delfa.sarabia@coffey.com	Phone:		Email:	Matthew.locke @coffey.com

Project No: SYDGE 211253 Task No: Fieldwork
Project Name: Concord Laboratory: MGT - Eurofins
Sampler's Name: Aiden McKenzie Project Manager: Delfa Sarabia
Special Instructions:

Analysis Request Section

577580

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B4 - PAH/TRH/BTEX	Suite H8 - Metals 8	Suite B3 - OCP/PCB	BTEX, TRH C6-C10	Hold	NOTES
	BH102/0.05 - 0.2	14.12.17		soil	Jar	Standard	✓	✓	✓			
	BH102/0.5 - 0.7	"		soil	Jar	"					✓	
	BH102/1.1 - 1.3	"		soil	Jar	"	✓	✓				
	R1-14.12.17	14.12.17		water	amber/vial	standard	✓	✓				
	Dup1-14.12.17	"		soil	jar	standard	✓	✓				
	Dup2-14.12.17	"		"	"	"	✓	✓				Please forward to ALS
	TS1-14.12.17	"		water	vial	standard				✓		

RELINQUISHED BY			RECEIVED BY		
Name: Simon Hay	Date: 14.12.17	→	Name: Mory	Date: 14/12/17	
Coffey Environments	Time: 4:00		Company: Eurofins	Time: 17:50	
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 11.5 ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No. 577580

***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, OP - Other Preservative

GOWANS PRINTING (02) 9755 3545

Melbourne
3-5 Kingston Town Close
Oakleigh Vic 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

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

Sample Receipt Advice

Company name:	**Coffey Environments Pty Ltd NSW**
Contact name:	Matthew Locke
Project name:	CONCORD
Project ID:	SYDGE211253
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Dec 14, 2017 5:00 PM
Eurofins | mgt reference:	**577580**

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 : 11.5 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.

☑ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

TS1_14.12.17 water trip spike not received. Two soil trip spike labs received instead. Logged on HOLD| DUP2_14.12.17 forwarded to ALS

Contact notes

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

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

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 Environments Pty Ltd NSW email address.

eurofins | mgt

30 years Testing For Life 1987–2017
Celebrating 30 years Testing and Protecting Human Health

Certificate of Analysis

Coffey Environments Pty Ltd NSW
Level 20, 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 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Matthew Locke**

Report **577580-S**
Project name CONCORD
Project ID SYDGE211253
Received Date Dec 14, 2017

Client Sample ID			**BH102/0.05-0.2**	**BH102/1.1-1.3**	**DUP1_14.12.17**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S17-De19816**	**S17-De19818**	**S17-De19820**
Date Sampled			**Dec 14, 2017**	**Dec 14, 2017**	**Dec 14, 2017**
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	330	< 50	1100
TRH C29-C36	50	mg/kg	210	< 50	740
TRH C10-36 (Total)	50	mg/kg	540	< 50	1840
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	%	52	85	84
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	50	mg/kg	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	510	< 100	1800
TRH >C34-C40	100	mg/kg	100	< 100	460
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	6.2	1.8	15
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	6.2	2.0	15
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	6.2	2.3	15
Acenaphthene	0.5	mg/kg	0.9	< 0.5	2.7
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	1.5	< 0.5	4.5
Benz(a)anthracene	0.5	mg/kg	4.7	1.5	11
Benzo(a)pyrene	0.5	mg/kg	4.2	1.3	9.9
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	5.1	1.4	11
Benzo(g.h.i)perylene	0.5	mg/kg	3.2	1.0	7.0
Benzo(k)fluoranthene	0.5	mg/kg	1.7	0.6	4.6
Chrysene	0.5	mg/kg	4.1	1.3	10
Dibenz(a.h)anthracene	0.5	mg/kg	0.5	< 0.5	1.3

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH102/0.05-0.2 Soil S17-De19816 Dec 14, 2017	BH102/1.1-1.3 Soil S17-De19818 Dec 14, 2017	DUP1_14.12.17 Soil S17-De19820 Dec 14, 2017
Polycyclic Aromatic Hydrocarbons					
Fluoranthene	0.5	mg/kg	11	3.7	32
Fluorene	0.5	mg/kg	< 0.5	< 0.5	1.3
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	2.5	0.8	5.6
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	3.5	1.0	9.6
Pyrene	0.5	mg/kg	11	3.8	33
Total PAH*	0.5	mg/kg	53.9	16.4	143.5
2-Fluorobiphenyl (surr.)	1	%	97	98	93
p-Terphenyl-d14 (surr.)	1	%	99	106	91
Heavy Metals					
Arsenic	2	mg/kg	6.0	6.1	3.7
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	8.9	9.2	12
Copper	5	mg/kg	40	33	72
Lead	5	mg/kg	22	21	21
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	11	8.2	11
Zinc	5	mg/kg	230	74	590
% Moisture	1	%	10.0	7.7	7.0

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	Dec 19, 2017	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Dec 19, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 19, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 19, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 19, 2017	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soils by GCMS			
Metals M8	Sydney	Dec 19, 2017	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
% Moisture	Sydney	Dec 14, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

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

Melbourne
2-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**		**Received:**	Dec 14, 2017 5:00 PM
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	577580	**Due:**	Dec 21, 2017
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1004	**Contact Name:**	Matthew Locke
Project Name:	CONCORD				
Project ID:	SYDGE211253				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						HOLD	Metals M8	Moisture Set	Eurofins | mgt Suite B4
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	BH102/0.05-0.2	Dec 14, 2017		Soil	S17-De19816		X	X	X
2	BH102/0.5-0.7	Dec 14, 2017		Soil	S17-De19817	X			
3	BH102/1.1-1.3	Dec 14, 2017		Soil	S17-De19818		X	X	X
4	R1_14.12.17	Dec 14, 2017		Water	S17-De19819		X		X
5	DUP1_14.12.17	Dec 14, 2017		Soil	S17-De19820		X	X	X
6	TRIP SPIKE LAB	Dec 14, 2017		Soil	S17-De19821	X			
Test Counts						2	4	3	4

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. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. 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

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

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 and 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.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
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 & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

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	
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							
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							
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	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	75			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	%	85			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	82			70-130	Pass	
Toluene	%	88			70-130	Pass	
Ethylbenzene	%	91			70-130	Pass	
m&p-Xylenes	%	96			70-130	Pass	
o-Xylene	%	97			70-130	Pass	
Xylenes - Total	%	96			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	121			70-130	Pass	
TRH C6-C10	%	92			70-130	Pass	
TRH >C10-C16	%	84			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	98			70-130	Pass	
Acenaphthylene	%	102			70-130	Pass	
Anthracene	%	109			70-130	Pass	
Benz(a)anthracene	%	105			70-130	Pass	
Benzo(a)pyrene	%	109			70-130	Pass	
Benzo(b&j)fluoranthene	%	103			70-130	Pass	
Benzo(g.h.i)perylene	%	107			70-130	Pass	
Benzo(k)fluoranthene	%	101			70-130	Pass	
Chrysene	%	102			70-130	Pass	
Dibenz(a.h)anthracene	%	108			70-130	Pass	
Fluoranthene	%	94			70-130	Pass	
Fluorene	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	109			70-130	Pass	
Naphthalene	%	94			70-130	Pass	
Phenanthrene	%	97			70-130	Pass	
Pyrene	%	94			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	95			70-130	Pass	
Cadmium	%	97			70-130	Pass	
Chromium	%	96			70-130	Pass	
Copper	%	95			70-130	Pass	
Lead	%	95			70-130	Pass	
Mercury	%	99			70-130	Pass	
Nickel	%	96			70-130	Pass	
Zinc	%	98			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	S17-De26293	NCP	%	80			70-130	Pass	
TRH C10-C14	S17-De27608	NCP	%	83			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S17-De26293	NCP	%	81			70-130	Pass	
Toluene	S17-De26293	NCP	%	86			70-130	Pass	
Ethylbenzene	S17-De26293	NCP	%	98			70-130	Pass	
m&p-Xylenes	S17-De26293	NCP	%	105			70-130	Pass	
o-Xylene	S17-De26293	NCP	%	111			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Xylenes - Total	S17-De26293	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S17-De26293	NCP	%	80			70-130	Pass	
TRH C6-C10	S17-De26293	NCP	%	87			70-130	Pass	
TRH >C10-C16	S17-De27608	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S17-De23093	NCP	%	99			70-130	Pass	
Acenaphthylene	S17-De23093	NCP	%	107			70-130	Pass	
Anthracene	S17-De23093	NCP	%	111			70-130	Pass	
Benz(a)anthracene	S17-De23093	NCP	%	112			70-130	Pass	
Benzo(a)pyrene	S17-De23093	NCP	%	97			70-130	Pass	
Benzo(b&j)fluoranthene	S17-De23093	NCP	%	94			70-130	Pass	
Benzo(g.h.i)perylene	S17-De23093	NCP	%	111			70-130	Pass	
Benzo(k)fluoranthene	S17-De23093	NCP	%	93			70-130	Pass	
Chrysene	S17-De23093	NCP	%	99			70-130	Pass	
Dibenz(a.h)anthracene	S17-De23093	NCP	%	102			70-130	Pass	
Fluoranthene	S17-De27263	NCP	%	120			70-130	Pass	
Fluorene	S17-De23093	NCP	%	107			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S17-De23093	NCP	%	100			70-130	Pass	
Naphthalene	S17-De23093	NCP	%	104			70-130	Pass	
Phenanthrene	S17-De23093	NCP	%	109			70-130	Pass	
Pyrene	S17-De27263	NCP	%	121			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S17-De24070	NCP	%	94			70-130	Pass	
Cadmium	S17-De24070	NCP	%	95			70-130	Pass	
Chromium	S17-De24070	NCP	%	80			70-130	Pass	
Copper	S17-De24070	NCP	%	96			70-130	Pass	
Lead	S17-De24070	NCP	%	83			70-130	Pass	
Mercury	S17-De24070	NCP	%	72			70-130	Pass	
Nickel	S17-De24070	NCP	%	95			70-130	Pass	
Zinc	S17-De24070	NCP	%	119			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	S17-De23080	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S17-De27266	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S17-De27266	NCP	mg/kg	85	88	4.0	30%	Pass	
TRH C29-C36	S17-De27266	NCP	mg/kg	71	95	29	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S17-De23080	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S17-De23080	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S17-De23080	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S17-De23080	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S17-De23080	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S17-De23080	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S17-De23080	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S17-De23080	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S17-De27266	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S17-De27266	NCP	mg/kg	160	190	18	30%	Pass	
TRH >C34-C40	S17-De27266	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S17-De27315	NCP	mg/kg	9.5	9.4	1.0	30%	Pass	
Fluorene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S17-De25924	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S17-De27315	NCP	mg/kg	7.8	7.8	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S17-De23080	NCP	mg/kg	14	15	8.0	30%	Pass	
Cadmium	S17-De23080	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S17-De23080	NCP	mg/kg	39	41	7.0	30%	Pass	
Copper	S17-De23080	NCP	mg/kg	11	12	7.0	30%	Pass	
Lead	S17-De23080	NCP	mg/kg	28	30	8.0	30%	Pass	
Mercury	S17-De23080	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S17-De23080	NCP	mg/kg	9.0	9.5	6.0	30%	Pass	
Zinc	S17-De23080	NCP	mg/kg	26	27	4.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S17-De19825	NCP	%	< 1	< 1	<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

Comments

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

Authorised By

Nibha Vaidya Analytical Services Manager

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

Measurement uncertainty of test data is available on request or please click here.

eurofins | mgt

30 years Testing For Life 1987–2017
Celebrating 30 years Testing and Protecting Human Health

Certificate of Analysis

Coffey Environments Pty Ltd NSW
Level 20, 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 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Matthew Locke**

Report **577580-W**
Project name CONCORD
Project ID SYDGE211253
Received Date Dec 14, 2017

Client Sample ID			**R1_14.12.17**
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S17-De19819**
Date Sampled			**Dec 14, 2017**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	88
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			R1_14.12.17
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S17-De19819**
Date Sampled			**Dec 14, 2017**
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	71
p-Terphenyl-d14 (surr.)	1	%	87
Heavy Metals			
Arsenic	0.001	mg/L	< 0.001
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Copper	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	< 0.001
Zinc	0.005	mg/L	0.006

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	Dec 14, 2017	7 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Dec 14, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 14, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 14, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 14, 2017	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Water by GCMS			
Metals M8	Sydney	Dec 14, 2017	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

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

Melbourne
2-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**		**Received:**	Dec 14, 2017 5:00 PM
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	577580	**Due:**	Dec 21, 2017
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1004	**Contact Name:**	Matthew Locke
Project Name:	CONCORD				
Project ID:	SYDGE211253				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						HOLD	Metals M8	Moisture Set	Eurofins | mgt Suite B4
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	BH102/0.05-0.2	Dec 14, 2017		Soil	S17-De19816		X	X	X
2	BH102/0.5-0.7	Dec 14, 2017		Soil	S17-De19817	X			
3	BH102/1.1-1.3	Dec 14, 2017		Soil	S17-De19818		X	X	X
4	R1_14.12.17	Dec 14, 2017		Water	S17-De19819		X		X
5	DUP1_14.12.17	Dec 14, 2017		Soil	S17-De19820		X	X	X
6	TRIP SPIKE LAB	Dec 14, 2017		Soil	S17-De19821	X			
Test Counts						2	4	3	4

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. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. 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

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

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 and 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.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
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 & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

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/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	91			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	%	113			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	97			70-130	Pass	
Toluene	%	102			70-130	Pass	
Ethylbenzene	%	103			70-130	Pass	
m&p-Xylenes	%	104			70-130	Pass	
o-Xylene	%	103			70-130	Pass	
Xylenes - Total	%	104			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	103			70-130	Pass	
TRH C6-C10	%	97			70-130	Pass	
TRH >C10-C16	%	123			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	82			70-130	Pass	
Acenaphthylene	%	92			70-130	Pass	
Anthracene	%	94			70-130	Pass	
Benz(a)anthracene	%	88			70-130	Pass	
Benzo(a)pyrene	%	89			70-130	Pass	
Benzo(b&j)fluoranthene	%	91			70-130	Pass	
Benzo(g.h.i)perylene	%	86			70-130	Pass	
Benzo(k)fluoranthene	%	85			70-130	Pass	
Chrysene	%	90			70-130	Pass	
Dibenz(a.h)anthracene	%	78			70-130	Pass	
Fluoranthene	%	90			70-130	Pass	
Fluorene	%	92			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	78			70-130	Pass	
Naphthalene	%	80			70-130	Pass	
Phenanthrene	%	91			70-130	Pass	
Pyrene	%	90			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	101			70-130	Pass	
Cadmium	%	99			70-130	Pass	
Chromium	%	103			70-130	Pass	
Copper	%	99			70-130	Pass	
Lead	%	104			70-130	Pass	
Mercury	%	108			70-130	Pass	
Nickel	%	101			70-130	Pass	
Zinc	%	101			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S17-De21001	NCP	%	110			70-130	Pass	
Cadmium	S17-De21001	NCP	%	95			70-130	Pass	
Chromium	S17-De21001	NCP	%	90			70-130	Pass	
Copper	S17-De21001	NCP	%	80			70-130	Pass	
Lead	S17-De21001	NCP	%	86			70-130	Pass	
Mercury	S17-De21001	NCP	%	89			70-130	Pass	
Nickel	S17-De21001	NCP	%	82			70-130	Pass	
Zinc	S17-De21001	NCP	%	80			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	S17-De19819	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S17-De19819	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	S17-De19819	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S17-De19819	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S17-De19819	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	S17-De19819	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S17-De19819	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S17-De19819	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	S17-De19819	CP	mg/L	0.006	0.005	16	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

Comments

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

Authorised By

Nibha Vaidya Analytical Services Manager

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

Measurement uncertainty of test data is available on request or please click here.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1732034**

Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR MATTHEW LOCKE	Contact	: Angelene Kumar
Address	: LEVEL 19, 799 PACIFIC HIGHWAY Tower B - Citadel Tower CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: matthew.locke@coffey.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 9911 1000	Telephone	: +61 2 8784 8555
Facsimile	: +61 9911 1001	Facsimile	: +61-2-8784 8500
Project	: SYDGE 211253 Concord	Page	: 1 of 2
Order number	: ----	Quote number	: EM2017COFENV0002 (EN/007/16)
C-O-C number	: 110351	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 2017 Blanket Quote - Primary Samples		
Sampler	: AIDEN MCKENZIE		

Dates

Date Samples Received	: 15-Dec-2017 12:00	Issue Date	: 16-Dec-2017
Client Requested Due Date	: 28-Dec-2017	Scheduled Reporting Date	: **28-Dec-2017**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 15.7 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES1732034-001	14-Dec-2017 00:00	Dup 2_14.12.17	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

DELFA SARABIA		
- A4 - AU Tax Invoice (INV)	Email	delfa.sarabia@coffey.com
INVOICES CHAT-GeneralAdmin		
- A4 - AU Tax Invoice (INV)	Email	CHAT-GeneralAdmin@coffey.com
MATTHEW LOCKE		
- *AU Certificate of Analysis - NATA (COA)	Email	matthew.locke@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	matthew.locke@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	matthew.locke@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	matthew.locke@coffey.com
- A4 - AU Tax Invoice (INV)	Email	matthew.locke@coffey.com
- Chain of Custody (CoC) (COC)	Email	matthew.locke@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	matthew.locke@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	matthew.locke@coffey.com
SIMON HAY		
- *AU Certificate of Analysis - NATA (COA)	Email	simon.hay@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	simon.hay@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	simon.hay@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	simon.hay@coffey.com
- A4 - AU Tax Invoice (INV)	Email	simon.hay@coffey.com
- Chain of Custody (CoC) (COC)	Email	simon.hay@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	simon.hay@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	simon.hay@coffey.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1732034**	Page	: 1 of 6
Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR MATTHEW LOCKE	Contact	: Angelene Kumar
Address	: LEVEL 19, 799 PACIFIC HIGHWAY Tower B - Citadel Tower CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9911 1000	Telephone	: +61 2 8784 8555
Project	: SYDGE 211253 Concord	Date Samples Received	: 15-Dec-2017 12:00
Order number	: ----	Date Analysis Commenced	: 19-Dec-2017
C-O-C number	: 110351	Issue Date	: 27-Dec-2017 16:28
Sampler	: AIDEN MCKENZIE		
Site	: 2017 Blanket Quote - Primary Samples		
Quote number	: EN/007/16		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP071: Results of sample Dup 2_14.12.17 have been confirmed by re-extraction and re-analysis.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	Dup 2_14.12.17	----	----	----	----
			Client sampling date / time	14-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1732034-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**6.9**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**19**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**42**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**17**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**15**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**376**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	**0.8**	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	**3.9**	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	**1.9**	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	**12.4**	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	**6.1**	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	**37.7**	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	**39.7**	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	**17.0**	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	**15.9**	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	**21.7**	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	**9.5**	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	**17.6**	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	**7.8**	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	**1.6**	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	**9.9**	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	**204**	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	**25.0**	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**25.0**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**25.0**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Dup 2_14.12.17	----	----	----	----
				Client sampling date / time	14-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1732034-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		**900**	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		**780**	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		**1680**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		**1470**	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		**590**	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		**2060**	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**73.1**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**90.2**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**76.5**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**91.0**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**87.6**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**82.8**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**93.4**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**107**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Dup 2_14.12.17	----	----	----	----
				Client sampling date / time	14-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1732034-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**87.4**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1 **110352**

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Consigning Office: Coffey Chatswood
Report Results to: Matthew Lake
Invoices to: Delfa Sarabia
Mobile: 0424 703 089
Phone:
Email: simon.hay @coffey.com
Email: @coffey.com

Project No: SYDGE 211 253
Task No: Fieldwork
Project Name: Concord
Laboratory: Eurofins
Sampler's Name: Simon Hay
Project Manager: Delfa Sarabia
Special Instructions: 5 DAY TAT

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	M8 - metals	~~BH - TRH, BTEX, PAH~~	BTEX, C6-C9 (TRH)	Suite B1 - TRH, BTEX	Low Level PAHs	NOTES
	~~[illegible] GME~~	21.12.17		Water	Amber/vial/plastic	5 DAY						
	BH102_[illegible] GME	↓		↓	↓	↓	✓			✓	✓	
	BH205_[illegible] GME	↓		↓	↓	↓	✓			✓	✓	
	BH211_[illegible] GME	↓		↓	↓	↓	✓			✓	✓	
	BH302_[illegible] GME	↓		↓	↓	↓	✓			✓	✓	
	BH307_[illegible] GME	↓		↓	↓	↓	✓			✓	✓	
	BH310_[illegible] GME	↓		↓	↓	↓	✓			✓	✓	
	R1_21_12_17_GME	↓		↓	↓	↓	✓			✓		
	Dup1_21_12_17_GME	↓		↓	↓	↓	✓			✓		
	Dup2_21_12_17_GME	↓		↓	↓	↓	✓			✓		Please forward to ALS
	TS1_21_12_17_GME	↓		↓	vial	↓			✓			
	TB1_21_12_17 GME	↓		↓	vial	↓			✓			

RELINQUISHED BY		RECEIVED BY	
Name: SIMON HAY	Date: 21.12.17	Name: Jordan Yu	Date: 21/12/17
Coffey Environments	Time: 4:30pm	Company: Eurofins mgt	Time: 17:20
Name:	Date:	Name: Amy	Date: 22/12/17
Company:	Time:	Company: EF/MGT 578955	Time: 12:00

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, **OP** - Other Preservative

GOWANS PRINTING (02) 9755 3545

Melbourne
3-5 Kingston Town Close
Oakleigh Vic 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

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

Sample Receipt Advice

Company name:	**Coffey Environments Pty Ltd NSW**
Contact name:	Matthew Locke
Project name:	CONCORD
Project ID:	SYDGE211253
COC number:	110352
Turn around time:	5 Day
Date/Time received:	Dec 21, 2017 5:20 PM
Eurofins | mgt reference:	**578955**

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 : 10.1 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.

☑ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

R1 and Dup1 no amber received Cannot do semi-volatile tests.

Contact notes

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

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

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 Environments Pty Ltd NSW email address.

Certificate of Analysis

Coffey Environments Pty Ltd NSW
Level 20, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Attention: **Matthew Locke**

Report **578955-W-V2**
Project name CONCORD
Project ID SYDGE211253
Received Date Dec 21, 2017

Client Sample ID			**BH102_GME**	**BH205_GME**	**BH211_GME**	**BH302_GME**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**M17-De32014**	**M17-De32015**	**M17-De32016**	**M17-De32017**
Date Sampled			**Dec 21, 2017**	**Dec 21, 2017**	**Dec 21, 2017**	**Dec 21, 2017**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	111	111	107	109
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Acenaphthylene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Anthracene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Benz(a)anthracene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene[N07]	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Benzo(g.h.i)perylene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Benzo(k)fluoranthene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Chrysene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dibenz(a.h)anthracene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Fluoranthene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Fluorene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Indeno(1.2.3-cd)pyrene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005

Client Sample ID			BH102_GME	BH205_GME	BH211_GME	BH302_GME
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M17-De32014	M17-De32015	M17-De32016	M17-De32017
Date Sampled			Dec 21, 2017	Dec 21, 2017	Dec 21, 2017	Dec 21, 2017
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Phenanthrene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Pyrene	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Total PAH*	0.00005	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005
2-Fluorobiphenyl (surr.)	1	%	82	57	61	60
p-Terphenyl-d14 (surr.)	1	%	128	113	118	83
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.002	0.002	0.003	0.003
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	0.0005
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.002	0.003	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.006	0.024	0.007	0.16
Zinc (filtered)	0.005	mg/L	0.028	0.096	< 0.005	0.62

Client Sample ID			BH307_GME	BH310_GME	R1_21_12_17_GME	DUP1_21_12_17_GME
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M17-De32018	M17-De32019	M17-De32020	M17-De32021
Date Sampled			Dec 21, 2017	Dec 21, 2017	Dec 21, 2017	Dec 21, 2017
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	0.03	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	-	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	-	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	0.03	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	-	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	-	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	-	-
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	-	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	0.014	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	109	107	114	104

Client Sample ID			BH307_GME	BH310_GME	R1_21_12_17_GME	DUP1_21_12_17_GME
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M17-De32018	M17-De32019	M17-De32020	M17-De32021
Date Sampled			Dec 21, 2017	Dec 21, 2017	Dec 21, 2017	Dec 21, 2017
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Acenaphthylene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Anthracene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Benz(a)anthracene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	-	-
Benzo(b&j)fluoranthene[N07]	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Benzo(g.h.i)perylene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Benzo(k)fluoranthene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Chrysene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Dibenz(a.h)anthracene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Fluoranthene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Fluorene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Indeno(1.2.3-cd)pyrene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Naphthalene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Phenanthrene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Pyrene	0.00005	mg/L	< 0.00005	< 0.00005	-	-
Total PAH*	0.00005	mg/L	< 0.00005	< 0.00005	-	-
2-Fluorobiphenyl (surr.)	1	%	65	61	-	-
p-Terphenyl-d14 (surr.)	1	%	94	121	-	-
Heavy Metals						
Arsenic	0.001	mg/L	-	-	< 0.001	-
Arsenic (filtered)	0.001	mg/L	0.007	< 0.001	-	0.004
Cadmium	0.0002	mg/L	-	-	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	-	< 0.0002
Chromium	0.001	mg/L	-	-	< 0.001	-
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Copper	0.001	mg/L	-	-	< 0.001	-
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Lead	0.001	mg/L	-	-	< 0.001	-
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Mercury	0.0001	mg/L	-	-	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	-	< 0.0001
Nickel	0.001	mg/L	-	-	< 0.001	-
Nickel (filtered)	0.001	mg/L	0.12	0.009	-	0.007
Zinc	0.005	mg/L	-	-	< 0.005	-
Zinc (filtered)	0.005	mg/L	0.041	0.018	-	0.006

Client Sample ID			[R20]TS1_21_12_17_GME	TB1_21_12_17_GME
Sample Matrix			Water	Water
Eurofins | mgt Sample No.			M17-De32022	M17-De32023
Date Sampled			Dec 21, 2017	Dec 21, 2017
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	0.02	mg/L	110	< 0.02

Client Sample ID			R20TS1_21_12_17_GME	TB1_21_12_17_GME
Sample Matrix			**Water**	**Water**
Eurofins | mgt Sample No.			**M17-De32022**	**M17-De32023**
Date Sampled			**Dec 21, 2017**	**Dec 21, 2017**
Test/Reference	LOR	Unit		
BTEX				
Benzene	0.001	mg/L	96	< 0.001
Toluene	0.001	mg/L	90	< 0.001
Ethylbenzene	0.001	mg/L	87	< 0.001
m&p-Xylenes	0.002	mg/L	86	< 0.002
o-Xylene	0.001	mg/L	88	< 0.001
Xylenes - Total	0.003	mg/L	87	< 0.003
4-Bromofluorobenzene (surr.)	1	%	124	112

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 - 2013 NEPM Fractions	Melbourne	Dec 27, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons	Melbourne	Dec 27, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jan 03, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C36			
BTEX	Melbourne	Dec 27, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B1			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 03, 2018	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Melbourne	Jan 03, 2018	7 Day
- Method: LTM-ORG-2130 PAH and Phenols in Water by GCMS			
Metals M8	Melbourne	Dec 27, 2017	28 Days
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Metals M8 filtered	Melbourne	Dec 27, 2017	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

eurofins | mgt

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

Melbourne
2-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name: Coffey Environments Pty Ltd NSW
Address: Level 20, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: CONCORD
Project ID: SYDGE211253

Order No.:
Report #: 578955
Phone: +61 2 9406 1000
Fax: +61 2 9406 1004

Received: Dec 21, 2017 5:20 PM
Due: Jan 2, 2018
Priority: 5 Day
Contact Name: Matthew Locke

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						TRH C6-C9	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Eurofins | mgt Suite B1	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH102_GME	Dec 21, 2017		Water	M17-De32014		X		X		X	
2	BH205_GME	Dec 21, 2017		Water	M17-De32015		X		X		X	
3	BH211_GME	Dec 21, 2017		Water	M17-De32016		X		X		X	
4	BH302_GME	Dec 21, 2017		Water	M17-De32017		X		X		X	
5	BH307_GME	Dec 21, 2017		Water	M17-De32018		X		X		X	
6	BH310_GME	Dec 21, 2017		Water	M17-De32019		X		X		X	
7	R1_21_12_17_GME	Dec 21, 2017		Water	M17-De32020			X				X
8	DUP1_21_12_17_GME	Dec 21, 2017		Water	M17-De32021				X			X

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

Melbourne
2-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**		**Received:**	Dec 21, 2017 5:20 PM
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	578955	**Due:**	Jan 2, 2018
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1004	**Contact Name:**	Matthew Locke
Project Name:	CONCORD				
Project ID:	SYDGE211253				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						TRH C6-C9	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Eurofins | mgt Suite B1	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
9	TS1_21_12_17_GME	Dec 21, 2017		Water	M17-De32022	X				X		
10	TB1_21_12_17_GME	Dec 21, 2017		Water	M17-De32023	X				X		
Test Counts						2	6	1	7	2	6	2

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. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. 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

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

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 and 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.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
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 & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

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 - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.00005			0.00005	Pass	
Acenaphthylene	mg/L	< 0.00005			0.00005	Pass	
Anthracene	mg/L	< 0.00005			0.00005	Pass	
Benz(a)anthracene	mg/L	< 0.00005			0.00005	Pass	
Benzo(a)pyrene	mg/L	< 0.00001			0.00001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.00005			0.00005	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.00005			0.00005	Pass	
Benzo(k)fluoranthene	mg/L	< 0.00005			0.00005	Pass	
Chrysene	mg/L	< 0.00005			0.00005	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.00005			0.00005	Pass	
Fluoranthene	mg/L	< 0.00005			0.00005	Pass	
Fluorene	mg/L	< 0.00005			0.00005	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.00005			0.00005	Pass	
Naphthalene	mg/L	< 0.00005			0.00005	Pass	
Phenanthrene	mg/L	< 0.00005			0.00005	Pass	
Pyrene	mg/L	< 0.00005			0.00005	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	94			70-130	Pass	
Naphthalene	%	94			70-130	Pass	
TRH C6-C10	%	104			70-130	Pass	
TRH C6-C10	%	104			70-130	Pass	
TRH >C10-C16	%	105			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	112			70-130	Pass	
TRH C10-C14	%	119			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	95			70-130	Pass	
Toluene	%	90			70-130	Pass	
Ethylbenzene	%	86			70-130	Pass	
m&p-Xylenes	%	86			70-130	Pass	
Xylenes - Total	%	87			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	75			70-130	Pass	
Acenaphthylene	%	82			70-130	Pass	
Anthracene	%	84			70-130	Pass	
Benz(a)anthracene	%	92			70-130	Pass	
Benzo(a)pyrene	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	%	95			70-130	Pass	
Benzo(g.h.i)perylene	%	87			70-130	Pass	
Benzo(k)fluoranthene	%	108			70-130	Pass	
Chrysene	%	94			70-130	Pass	
Dibenz(a.h)anthracene	%	88			70-130	Pass	
Fluoranthene	%	94			70-130	Pass	
Fluorene	%	74			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	86			70-130	Pass	
Naphthalene	%	83			70-130	Pass	
Phenanthrene	%	87			70-130	Pass	
Pyrene	%	96			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	113			80-120	Pass	
Arsenic (filtered)	%	113			80-120	Pass	
Cadmium	%	97			80-120	Pass	
Cadmium (filtered)	%	97			80-120	Pass	
Chromium	%	112			80-120	Pass	
Chromium (filtered)	%	112			80-120	Pass	
Copper	%	105			80-120	Pass	
Copper (filtered)	%	105			80-120	Pass	
Lead	%	95			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead (filtered)			%	95			80-120	Pass	
Mercury			%	89			75-125	Pass	
Mercury (filtered)			%	89			70-130	Pass	
Nickel			%	107			80-120	Pass	
Nickel (filtered)			%	107			80-120	Pass	
Zinc			%	93			80-120	Pass	
Zinc (filtered)			%	93			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	B17-De32294	NCP	%	112			70-130	Pass	
Naphthalene	B17-De32294	NCP	%	112			70-130	Pass	
TRH C6-C10	B17-De32294	NCP	%	126			70-130	Pass	
TRH C6-C10	B17-De32294	NCP	%	126			70-130	Pass	
TRH >C10-C16	Z17-De24602	NCP	%	71			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	B17-De32294	NCP	%	128			70-130	Pass	
TRH C10-C14	Z17-De24602	NCP	%	76			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	B17-De32294	NCP	%	123			70-130	Pass	
Toluene	B17-De32294	NCP	%	118			70-130	Pass	
Ethylbenzene	B17-De32294	NCP	%	115			70-130	Pass	
m&p-Xylenes	B17-De32294	NCP	%	114			70-130	Pass	
o-Xylene	B17-De32294	NCP	%	112			70-130	Pass	
Xylenes - Total	B17-De32294	NCP	%	113			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	M17-De32014	CP	%	107			70-130	Pass	
Cadmium (filtered)	M17-De32014	CP	%	99			70-130	Pass	
Chromium (filtered)	M17-De32014	CP	%	101			70-130	Pass	
Copper (filtered)	M17-De32014	CP	%	98			70-130	Pass	
Lead (filtered)	M17-De32014	CP	%	98			70-130	Pass	
Mercury (filtered)	M17-De32014	CP	%	113			70-130	Pass	
Nickel (filtered)	M17-De32014	CP	%	100			70-130	Pass	
Zinc (filtered)	M17-De32014	CP	%	101			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	B17-De29560	NCP	%	114			75-125	Pass	
Cadmium	B17-De29560	NCP	%	96			75-125	Pass	
Chromium	B17-De29560	NCP	%	109			75-125	Pass	
Copper	B17-De29560	NCP	%	101			75-125	Pass	
Lead	B17-De29560	NCP	%	98			75-125	Pass	
Mercury	B17-De29560	NCP	%	101			70-130	Pass	
Nickel	B17-De29560	NCP	%	102			75-125	Pass	
Zinc	B17-De29560	NCP	%	93			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M17-De32329	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	M17-De32329	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	M17-De32014	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C16-C34	M17-De32014	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M17-De32014	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M17-De32329	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	M17-De32014	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M17-De32014	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M17-De32014	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M17-De32329	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M17-De32329	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M17-De32329	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M17-De32329	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M17-De32329	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	M17-De32329	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Acenaphthylene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Anthracene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Benz(a)anthracene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Benzo(a)pyrene	M17-De32014	CP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Benzo(g.h.i)perylene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Benzo(k)fluoranthene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Chrysene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Dibenz(a.h)anthracene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Fluoranthene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Fluorene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Naphthalene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Phenanthrene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Pyrene	M17-De32014	CP	mg/L	< 0.00005	< 0.00005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	M17-De32014	CP	mg/L	0.002	0.002	<1	30%	Pass	
Cadmium (filtered)	M17-De32014	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	M17-De32014	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	M17-De32014	CP	mg/L	0.002	0.002	4.0	30%	Pass	
Lead (filtered)	M17-De32014	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	M17-De32014	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	M17-De32014	CP	mg/L	0.006	0.006	1.0	30%	Pass	
Zinc (filtered)	M17-De32014	CP	mg/L	0.028	0.030	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	B17-De29560	NCP	mg/L	0.001	0.001	1.0	30%	Pass	
Cadmium	B17-De29560	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	B17-De29560	NCP	mg/L	0.001	0.002	27	30%	Pass	
Copper	B17-De29560	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	B17-De29560	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	B17-De29560	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Nickel	B17-De29560	NCP	mg/L	0.001	0.001	16	30%	Pass	
Zinc	B17-De29560	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

This report has been revised (V2) to amend BTEX and volatile test results for sample M17-De32022.

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

Comments

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
R20	This sample is a Trip Spike and therefore all results are reported as a percentage

Authorised By

Nibha Vaidya	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

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

Measurement uncertainty of test data is available on request or please click here.

 110352

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey environments
SPECIALISTS IN ENVIRONMENTAL SOCIAL AND SAFETY PERFORMANCE

Consigning Office: Coffey Chatswood
Report Results to: Matthew Locke
Invoices to: Delfa Serabia

Mobile: 0424 703 089
Phone:
Email: simon.hay @coffey.com
Email: @coffey.com

Project No: SYDGE 211 253
Task No: Fieldwork
Project Name: Concord
Laboratory: Eurofins
Sampler's Name: Simon Hay
Project Manager: Delfa Serabia
Special Instructions: 5 DAY TAT

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	M8 - metals	~~BH - TRH, BTEX PAH~~	BTEX	C6-C9 (TRH)	Low Level PAHs
	[redacted]	21.12.17		Water	Amber/vial/plastic	5 DAY					
	BH102 _ GW04 GME	↓		↓	↓	↓	✓			✓	✓
	BH205 _ GW04 GME	↓		↓	↓	↓	✓			✓	✓
	BH211 _ GW04 GME	↓		↓	↓	↓	✓			✓	✓
	BH302 _ GW04 GME	↓		↓	↓	↓	✓			✓	✓
	BH307 _ GW04 GME	↓		↓	↓	↓	✓			✓	✓
	BH310 _ GW04 GME	↓		↓	↓	↓	✓			✓	✓
	R1 _ 21 _ 12 _ 17 _ GME	↓		↓	↓	↓	✓			✓	
	Dup1 _ 21 _ 12 _ 17 _ GME	↓		↓	↓	↓	✓			✓	
	Dup2 _ 21 _ 12 _ 17 _ GME	↓		↓	↓	↓	✓			✓	
	TS1 _ 21 _ 12 _ 17 _ GME	↓		↓	vial	↓			✓		
	TB1 _ 21 _ 12 _ 17 GME	↓		↓	vial	↓			✓		

Environmental Division
Melbourne
Work Order Reference
EM1717738

Telephone : + 61-3-8549 9600

Please forward to ALS

RELINQUISHED BY		RECEIVED BY	
Name: SIMON HAY	Date: 21.12.17	Name: Jordan Yu	Date: 21/12/17
Coffey Environments	Time: 4:30pm	Company: Coffey (?)	Time: 17:20
Name:	Date:	Name: Amy	Date: 22/12/17
Company:	Time:	Company: MGT 578955	Time: 12:00

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, OP - Other Preservative

Received by Scott (ALS) 28/12/17, 12.35.

GOWANS PRINTING (02) 9755 3545

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM1717738**		
Client	: **COFFEY GEOTECHNICS**	Laboratory	: Environmental Division Melbourne
Contact	: DELFA SARABIA	Contact	: Bronwyn Sheen
Address	:	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: delfa_sarabia@coffey.com	E-mail	: bronwyn.sheen@alsglobal.com
Telephone	: +61 02 9911 1000	Telephone	: +61-3-8549 9636
Facsimile	: +61 02 99111001	Facsimile	: +61-3-8549 9601
Project	: SYDGE211253	Page	: 1 of 2
Order number	: ----	Quote number	: EM2017COFGEO0002 (EN/077/16)
C-O-C number	: 110352	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: SH		

Dates

Date Samples Received	: 28-Dec-2017 12:35	Issue Date	: 28-Dec-2017
Client Requested Due Date	: 05-Jan-2018	Scheduled Reporting Date	: **05-Jan-2018**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 9.7°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - W-02 8 Metals	WATER - W-18 TRH(C6 - C9)/BTEXN
EM1717738-001	21-Dec-2017 00:00	Dup2_21_12_17_GME	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

DELFA SARABIA

- *AU Certificate of Analysis - NATA (COA)	Email	delfa_sarabia@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	delfa_sarabia@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	delfa_sarabia@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	delfa_sarabia@coffey.com
- A4 - AU Tax Invoice (INV)	Email	delfa_sarabia@coffey.com
- Chain of Custody (CoC) (COC)	Email	delfa_sarabia@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	delfa_sarabia@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	delfa_sarabia@coffey.com

MATTHEW LOCKE

- *AU Certificate of Analysis - NATA (COA)	Email	matthew.locke@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	matthew.locke@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	matthew.locke@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	matthew.locke@coffey.com
- Chain of Custody (CoC) (COC)	Email	matthew.locke@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	matthew.locke@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	matthew.locke@coffey.com

SIMON HAY

- *AU Certificate of Analysis - NATA (COA)	Email	simon.hay@coffey.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	simon.hay@coffey.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	simon.hay@coffey.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	simon.hay@coffey.com
- Chain of Custody (CoC) (COC)	Email	simon.hay@coffey.com
- EDI Format - ENMRG (ENMRG)	Email	simon.hay@coffey.com
- EDI Format - ESDAT (ESDAT)	Email	simon.hay@coffey.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1717738**	Page	: 1 of 4
Client	: **COFFEY GEOTECHNICS**	Laboratory	: Environmental Division Melbourne
Contact	: DELFA SARABIA	Contact	: Bronwyn Sheen
Address	:	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 02 9911 1000	Telephone	: +61-3-8549 9636
Project	: SYDGE211253	Date Samples Received	: 28-Dec-2017 12:35
Order number	: ----	Date Analysis Commenced	: 29-Dec-2017
C-O-C number	: 110352	Issue Date	: 03-Jan-2018 10:35
Sampler	: SH		
Site	: ----		
Quote number	: EN/077/16		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Dup2_21_12_17_GME	----	----	----	----
			Client sampling date / time	21-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM1717738-001	--------	--------	--------	--------
				Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	**0.004**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.004**	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.007**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	**0.011**	----	----	----	----
Lead	7439-92-1	0.001	mg/L	**0.009**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.029**	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ **Total Xylenes**	----	2	µg/L	<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**124**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**107**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**104**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

Appendix G – Quality Assurance/Control

DATA COMPLETENESS

Field Considerations

	Yes	No	Comments
Were all critical locations sampled?	☒	☐	Sampling was carried out in general accordance with the proposal, sampling constraints are discussed in Section 10 of this report.
Were all critical depths sampled?	☒	☐	Sampling was carried out in general accordance with the proposal, sampling constraints are discussed in Section 10 of this report.
Were the SOPs appropriate and complied with?	☒	☐	Coffey Environments Standard Operating Procedures (SOP) are consistent with relevant guidelines and were complied with by field staff.
Was the sampler adequately experienced?	☒	☐	Samples were collected by trained and appropriately experienced staff members from Coffey Environments.
Was the field documentation complete?	☒	☐	Daily field logs and records were compiled on-site by the Coffey Environments staff members. Samples selected for analysis were scheduled on the COC provided in Appendix F.
Is a copy of the signed chain of custody form for each batch of samples included?	☒	☐	Copies are included in Appendix F.

Laboratory Considerations

	Yes	No	Comment
Were all requested samples analysed?	☒	☐	Samples scheduled on the COC were analysed for the analytes requested.
Were the laboratory methods appropriate?	☒	☐	Methods used were the recommended industry methods/ standards and/or NATA accredited methods
Were the laboratory methods adopted NATA endorsed?	☒	☐	Laboratory analytical reports are provided in Appendix F.
Was the NATA Seal on the laboratory reports?	☒	☐	Laboratory analytical reports are provided in Appendix F.

	Yes	No	Comment
Were the laboratory reports signed by an authorised person?	☒	☐	Laboratory reports were signed by authorised signatories using electronic signatures.
Were the laboratory LORs below the assessment criteria?	☒	☐	N/A
Was sample documentation complete?	☒	☐	COCs were filled out correctly at time of dispatch and receipt, they are included with the sample receipt and analysis reports provided by the laboratories.
Were sample holding times complied with?	☒	☐	N/A
Custody Seals intact (if used)	☒	☐	N/A
Attempt to chill was evident	☒	☐	N/A
Sample correctly preserved	☒	☐	N/A
Appropriate sample containers have been used	☒	☐	N/A
Sample containers for volatile analysis received with minimal headspace	☒	☐	N/A

COMPLETENESS CONCLUSION

	Yes	No	Comment
Was data adequately complete?	☒	☐	Based on the information in the previous sections, Coffey is of the opinion that the data was adequately complete for the objective of the works.

DATA COMPARABILITY

Field considerations

	Yes	No	Comment
Was there more than one sampling round?	☒	☐	Soil sampling was undertaken on the 23rd of November and 14th of December 2017. Groundwater sampling was undertaken on 21st of December 2017.
Were the same sampling methodology and SOPs used for all sampling?	☒	☐	N/A
Was all sampling undertaken by the same sampler?	☐	☒	Soil sampling was undertaken by Aidan Mackenzie, an experienced geologist from Coffey and Russel Copeland, a geotechnical engineer from Coffey. Coffey SOPs for sampling were followed at all times during sampling. Goundwater sampling was undertaken by Simon Hay, an Environmental Scientists from Coffey. Coffey SOPs for sampling were followed at all times during sampling.
Were sample containers, preservation, filtering the same?	☒	☐	Containers used were supplied by the corresponding laboratories to provide appropriate sample storage.
Could climatic conditions (temperature, rainfall, wind) have influenced data comparability?	☒	☐	Coffey is of the opinion that the normal range of climatic conditions experienced over the sampling period would not significantly have affected data comparability. Samples were collected quickly and placed immediately in a cooled esky, where required.
Were the same types of samples collected (filtered, size fractions etc) for each media?	☒	☐	Samples were collected in laboratory supplied jars, bags and bottles.

Laboratory Considerations

	Yes	No	Comment
Were the same analytical methods used (including clean up)?	☒	☐	
Were the LORs the same?	☒	☐	LOR were generally the same.
Were the same laboratories used?	☒	☐	As discussed in Section 13 of the report.
Were the units reported the same?	☒	☐	

COMPARABILITY CONCLUSION

	Yes	No	Comment
Was data adequately comparable?	☒	☐	Overall, Coffey are of the opinion that the data was adequately comparable for the objective of the works.

DATA REPRESENTATIVENESS

Field Considerations

	Yes	No	Comment
Was appropriate media sampled?	☒	☐	Sampling was carried out in general accordance with the proposal, sampling constraints are discussed in Section 10 of the report.
Were all media identified sampled?	☒	☐	Sampling was carried out in general accordance with the proposal, sampling constraints are discussed in Section 10 of the report.
Were the samples properly and adequately preserved? This includes keeping the samples chilled, where applicable.	☒	☐	Samples were immediately placed in ice chilled cooler boxes for transport where required, under COC conditions. Sample jars were sealed, with minimal remaining headspace. Soil and groundwater samples were received at the laboratories in a chilled condition.
Were the samples in proper custody between the field and reaching the laboratory?	☒	☐	See COC documentation for this information.
Were the samples received by the laboratory in good condition?	☒	☐	Laboratory sample receipts are provided in Appendix F.

REPRESENTATIVENESS CONCLUSION

	Yes	No	Comment
Was data adequately representative?	☒	☐	Coffey is in the opinion that the data were adequately representative for the objective of the works.

DATA PRECISION AND ACCURACY

Field considerations

	Yes	No	Comment
Were the SOPs appropriate and complied with?	☒	☐	Coffey Standard Operating Procedures (SOP) are consistent with relevant guidelines and were complied with by field staff.
Was sampling equipment calibrated?	☒	☐	Calibration certificates are provided in Appendix H.

Summary of Media Sampled

Media	Number of Primary Samples Analysed	Days Sampling	Dates Sampling	Number of Batches	Primary Laboratory Report References
Soil	4	2	23/11/2017 14/12/2017	2	Eurofins 576600 Eurofins 577580
Water	6 samples total, 1 sample collected from a well located within the investigation area	1	21/12/2017	1	Eurofins 578955

Field Duplicate Samples

The purpose of duplicate samples were to estimate the variability of a given characteristic or contaminant associated with a population.

How were the field duplicate samples collected?	Media	Methodology
	Soil	Field duplicate soil samples were collected from soil immediately adjacent to the primary sample by placing approximately equal portions of the primary sample into two (2) sample jars. Samples were labelled so as to conceal their relationship to the primary sample from the laboratory.
	Groundwater	Duplicated groundwater samples were collected by placing approximately equal portions of the primary sample in approximately equal portions into the appropriate sets of vials. Samples were labelled so as to conceal their relationship to the primary sample from the laboratory.

What field duplicate samples were analysed?	**Media**	**Primary Sample**	**Intra-lab Duplicates**	**Inter-lab Duplicates**
	Soil	BH101/0.05-0.2	Dup1_14.12.17	Dup2_14.12.17
	Groundwater	BH211_GME	Dup1_21_12_17_GME	Dup1_21_12_17_GME

What was the rate of duplicate samples analysed?	**Media**	**Analyte**	**No of Primary Samples Analysed**	**Intra-lab Duplicates Analysed**		**Inter-lab Duplicates Analysed**	
				Quantity	**Rate**	**Quantity**	**Rate**
	Soil	Metals	4	1	>1:20	1	>1:20
	Soil	TRH	4	1	>1:20	1	>1:20
	Soil	BTEX	4	1	>1:20	1	>1:20
	Soil	PAH	4	1	>1:20	1	>1:20
What was the rate of duplicate samples analysed?	**Media**	**Analyte**	**No of Primary Samples Analysed**	**Intra-lab Duplicates Analysed**		**Inter-lab Duplicates Analysed**	
				Quantity	**Rate**	**Quantity**	**Rate**
	Groundwater	Metals	6	1	>1:20	1	>1:20
	Groundwater	TRH	6	1	>1:20	1	>1:20
	Groundwater	BTEX	6	1	>1:20	1	>1:20

Were an adequate number of field duplicates analysed?	**Media**	**Yes**	**No** (Comment Below)
	Soil	☒	☐
	Groundwater	☒	☐
Comments			

Relative percent differences (RPDs) were calculated for each of the duplicate samples analysed. RPDs were calculated by dividing the difference between the primary sample and duplicate sample by the average of the two, as shown below:

$$RPD = \frac{(X_1 - X_2)}{(X_1+X_2)/2} \times 100\%$$

Where: X_1 = Primary sample result; and

X_2 = Replicate sample result.

When calculating the RPDs, the following procedures were also considered	RPDs were only considered when a concentration was greater than 10 x LOR.
	In instances where results were greater than the LOR for the one (1) sample, but below LOR for the corresponding primary or duplicate sample, an RPD was not calculated.

Were RPD results within acceptable limits??	**Media**	**Results Table Reference**	**Yes**	**No** (Comment Below)
	Soil	Table T2	☐	☒

Comments
RPDs were found to be within the acceptable limits with the exception of PAHs, select metals and select TRH fractions between primary and intra-lab and inter-lab duplicates, which were exceeded. It is considered likely that these RPD exceedances are attributed to the heterogeneity of the fill rather than sampling and analysis methodology and procedures. Furthermore, concentrations of the select analytes in duplicate samples were generally in the same order of magnitude and the concentrations of analytes in both the interlab and intralab duplicates did not exceed the adopted assessment criteria. Overall, these exceedances are not considered to have impacted the results of the investigation.

Were RPD results within acceptable limits??	**Media**	**Results Table Reference**	**Yes**	**No** (Comment Below)
	Groundwater	Table T5	☒	☐

Comments
While RPDs for select metals were exceeded, concentrations were less than 10 times the LOR and were therefore not considered.

Trip Blanks

Trip blanks assess the potential for cross contamination between transit from the site to the laboratory. Samples were analysed for volatile compounds. The trip blank samples were prepared by the primary laboratories, carried to the field unopened and subjected to the same preservation methods as the primary field samples.

What trip blank samples were analysed? *What was the rate of trip blank samples analysed?*	**Media**	**Quantity Analysed**	**Sample ID**	**Rate**
	Groundwater	1	TB1_21_12_17_GME	1 per phase

Were an adequate number of trip blanks analysed to meet the data quality indicators?	**Media**	**Yes**	**No** (Comment Below)
	water	☒	☐
Comments			

Were the trip blank results within acceptable limits?	**Media**	**Results Table Reference**	**Yes**	**No (Comment Below)**
	Soil	Table T6	☒	☐
Comments				

Trip Spikes

Trip spikes are assessed for the potential loss of volatile constituents from samples whilst in transit from the site to the laboratory. The trip spike samples were prepared by the primary laboratories, and contained a known concentration of volatile compounds.

What trip spike samples were analysed? *What was the rate of trip spike samples analysed?*	**Media**	**Quantity Analysed**	**Sample ID**	**Rate**
	Groundwater	1	TS1_21_12_17_GME	1 per phase

Were an adequate number of trip blanks analysed to meet the data quality indicators?	**Media**	**Yes**	**No** (Comment Below)
	water	☒	☐
Comments			

Were the trip spike results within acceptable limits?	**Media**	**Results Table Reference**	**Yes**	**No (Comment Below)**
	Soil	Table T6	☒	☐
Comments				

Rinsate Blanks

Rinsate blanks consist of pre-preserved bottles filled with laboratory prepared water that is passed over decontaminated field equipment and then collected in containers used for the sampling process. Rinsate blanks were preserved in a similar manner to the original samples. The rinsate blank was a check on decontamination procedures.

What rinsate blank samples were analysed? *What was the rate of rinsate blank samples analysed?*	**Media**	**Quantity Analysed**	**Sample ID**	**Rate**
	Soil	1	R1_14.12.17	1 per phase
	Groundwater	1	R1_21.12.17	

Were an adequate number of rinsate blank samples analysed?	**Media**	**Yes**	**No** (Comment Below)
	Soil	☒	☐
	Groundwater	☒	☐
Comments			

Were the rinsate blank results within acceptable limits?	**Media**	**Results Table Reference**	**Yes**	**No** (Comment Below)
	Soil	Table T3	☐	☒
	Groundwater	Table T6	☒	☐
Comments Zinc in rinsate sample R1_14.12.17 was detected marginally above the LOR of 0.005 mg/L at 0.0006 mg/L. This is not considered to affect the outcome of the investigation.				

Field QA/QC Statement

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

Comments

Laboratory Considerations

Methods

The laboratories conducted their own internal quality program for assessment of the repeatability of the analytical procedures and instrument accuracy under their NATA accreditation. This included analysis of laboratory blank samples, duplicate samples, spike samples, control samples and surrogate spikes. The laboratory QA/QC procedures and results are described within the laboratory reports presented in Appendix F.

Results

The laboratory internal QA/QC sample results were reviewed and were consistent with the laboratory's NATA guidelines. Furthermore, the adoption of the general advisory ranges for specific recoveries has been used to screen laboratory data. Where recoveries were outside these ranges the data was assessed in relation to specific laboratory comments, published industry 'norms' for specific parameters and/or the likely impact on the interpretation of the meaning of the results.

Laboratory QA/QC Statement

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

DATA PRECISION AND ACCURACY CONCLUSION

	Yes	No	Comment
Was data adequately precise and accurate?	☒	☐	Overall, Coffey is of the opinion that the data were adequately precise and accurate for the objective of the works.

DATA USABILITY

Data Directly Usable ☐

Data Usable with the following considerations ☒

Data Not Usable. ☐

Considerations

Variability in PAHs, select metals and TRH fractions was noted between primary and duplicate samples, however the results are considered to be representative of the conditions at the time of sampling. The variability was likely attributable to the heterogeneity of contamination distribution in the material sampled.

Appendix H – Calibration Certificates

ThermoFisher SCIENTIFIC

The world leader in serving science

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 (8.4 v) 8.0v minimum

Date: 29/11/2017 Checked by: Jerry

Signed: JC

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 JRV

Quote Reference	CS007961	Condition on return
Customer Ref		
Equipment ID	SOL122-25	
Equipment serial no.	237574	
Return Date	/ /	
Return Time		

ThermoFisher SCIENTIFIC

The world leader in serving science

RENTALS

Equipment Report – Micropurge Flow Cell

This unit has been performance checked as follows:

Operations Check		
☑ Clean / decon		

Date: 30/11/2017 Checked by: Dave O'Neill

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
			Sample Pro Pump
☑	☐	☐	Flow Cell
☑	☐	☐	3-way valve
☑	☐	☐	Connecting tubes (3)
☒	☐	☐	Optional – cable
☐	☐	☐	
☐	☐	☐	

Processors Signature/ Initials

Quote Reference	CS007961	Condition on return
Customer Ref		
Equipment ID	EFLS00-22	
Equipment serial no.		
Return Date	/ /	
Return Time		

ThermoFisher SCIENTIFIC

The world leader in serving science

RENTALS

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 4.00	7.00 pH	4.00 pH	305409/309016	☑
Conductivity	12.88mS/cm	0.00 mS/cm	12.88 mS/cm	309852	☑
TDS	36 ppk	N/A ppk	check ONLY ppk	306264	☑
Dissolved Oxygen	Sodium Sulphite / Air	0.00 ppm in Sodium Sulphite	9.06 ppm Saturation in Air	5253(ss) 300125(DI)	☑

Check only

Redox (ORP) *	Electrode operability test	240mV +/- 10%	241 mV	306358(A) 306679(B)	☑

* 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 20.7 °C
☑ Electrodes Cleaned and checked

Tag No: 600507

Valid to: 06/02/2018

Date: 30/11/2017

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: 8.0
☑	☐	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: 30/11/2017

Signed: [signature]

TFS Reference	CS007961	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	90FLMV -2	Condition on return:	
Equipment Serial No.	W4488		

ThermoFisher SCIENTIFIC

The world leader in serving science

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 (8.0V/8.0V v) 8.0v minimum

Date: 20/12/2017 Checked by: Jerry

Signed: J

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 2
☑	☐	☐	Probe Cleaning Brush
☐	☐	☐	Decon
☑	☐	☐	Instruction leaflet
☑	☐	☐	Tape Guide
☐	☐	☐	

Processors Signature/ Initials MS

Quote Reference	CS0008090	Condition on return
Customer Ref		
Equipment ID	S122605A	
Equipment serial no.	12200509 3-1	
Return Date	/ /	
Return Time		

ThermoFisher SCIENTIFIC

The world leader in serving science

RENTALS

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 4.00	7.00 pH	4.01 pH	309016/308872	☑
Conductivity	12.88mS/cm	0.0 mS/cm	12.88 mS/cm	309852	☑
TDS	36 ppk	0.0 ppk	36.0 ppk	306264	☑
Dissolved Oxygen	Sodium Sulphite / Air	0.0 ppm in Sodium Sulphite	9.05 ppm Saturation in Air	5253 306207	☑

Check only

Redox (ORP) *	Electrode operability test	240mV +/- 10%	237 mV	306358 306679	☑

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

☑ Battery Status 8.17 (min 7.2V)
☑ Electrical Safety Tag attached (AS/NZS 3760)

☑ Temperature 20.0 °C
☑ Electrodes Cleaned and checked

Tag No: 000584

Valid to: 12/03/2018

Date: 20/12/2017

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: 8.17 V
☑	☐	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: 20/12/2017

Signed: [signature]

TFS Reference	CS0080890	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	90FLMV SN	Condition on return:	
Equipment Serial No.	U3539		

ThermoFisher SCIENTIFIC

The world leader in serving science

RENTALS

Equipment Report - MiniRAE 3000 PID

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

Lamp	Compound	Concentration	Zero	Span	Traceability Lot #	Pass?
10.6 eV	Isobutylene	100ppm	0 ppm	100 ppm	389261 CH19	☑

Alarm Limits

High	100 ppm
Low	50 ppm

Bump Test

Date	Target Gas	Reading	Pass?
14/12/17	100 ppm	100 ppm	☑

☑ Battery Status 100%
☑ 10 minutes test complete
☑ Spare battery status (Min 5.5 volts)
☑ Electrical Safety Tag attached (AS/NZS 3760)

Tag No: 000981

Valid to: 16/01/18

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

Date: 14/12/17

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
☑	☐	MiniRAE 2000 PID / Operational Check / Battery Status 100%
☑	☐	Lamp 10.6 eV, Compound Set to Isobutylene, C/factor: 1
☑	☐	Protective yellow rubber boot
☑	☐	Inlet probe (attached to PID)
☑	☐	Spare water trap filter(s) Qty 3
☑	☐	Charger 240V to 12V1250mA
☑	☐	Cradle and Travel Charger
☑	☐	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: 14/12/17

Signed: [signature]

TFS Reference	CS0008065	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	PID3000-48	Condition on return:	
Equipment Serial No.	592-916922		