APPENDIX 6

GES

GEO-ENVIRONMENTAL

SOLUTIONS

ENVIRONMENTAL SITE ASSESSMENT

115 Cove Hill Road, Bridgewater, October 2022

For Young Group

1 DOCUMENT CONTROL

Title	Version	Date	Author	Reviewed By
Environmental Site Assessment: 115 Cove Hill Road, Bridgewater, Tasmania	Version 1	27th October 2022	Mark Downie	JP Cumming
Environmental Site Assessment: 115 Cove Hill Road, Bridgewater, Tasmania	Version 2	7th November 2022	Mark Downie	JP Cumming

2 EXECUTIVE SUMMARY

This report presents the findings of an Environmental Site Assessment (ESA) undertaken by Geo-Environmental Solutions Pty. Ltd. (GES) at 115 Cove Hill Road, Bridgewater, hereby referred to as 'The Site'. GES was commissioned Young Group 'The Client'. This ESA has been prepared by a suitably qualified and experience practitioner in accordance with procedures and practices detailed in National Environmental Protection Measure [Assessment of Site Contamination] (NEPM ASC; 2013).

The objective of this ESA was to investigate the site for contamination, and to determine if any potential contamination at the site poses a risk to human health and/or the environment.

The client has requested this ESA in due diligence in order to determine the most suitable sites for construction and to identify potential areas of concern that may be affected by contamination resulting from previous land use.

The following information was gathered during the desktop investigation:

- The Site is zoned *Light Industrial* under the *Tasmanian Planning Scheme*. The site an open area of pasture and is mostly flat in the investigation area. The soil surface in the investigation area consists of natural clay soils which are unlikely to feature significant introduced fill. Surface water is likely to enter the existing stormwater system on Taylor Crescent, and tend towards the Jordan River, which is the closest ecological receptor 350m to the east. Groundwater is likely to tend in a similar direction.
- The geology of the investigation area is mapped as Tertiary aged Basalt (Tb) with excavations noting a clay soil overlying weathered Basalt bedrock at shallow depths.
- Historical aerial photographs confirmed that the site has been predominantly used for grazing prior to the 1980s, since that time the site has remained vacant however some debris including small piles of fill suggests dumping of rubbish in the vicinity.
- Potential sources of contamination include; the presence of fill on the site, the movement of contaminants from adjacent and upgradient industrial operations to the site, the risk of contaminants from materials or vehicles intermittently stored on the site.
- Contaminants Of Potential Concern (COPC) include the following: TPH/TRH; Mono Aromatic hydrocarbons: (BTEXN); PAH; and 15 metals.

From the soil assessment, it is concluded that:

- Environment: There were no EIL or ESL exceedances and therefore no risk to ecological receptors identified.
- Human Health: There were no human health guideline exceedances and therefore no risk to human receptors for dermal contact, dust inhalation and soil ingestion risk or vapour intrusion, at commercial/industrial land use guidelines.
- Excavated Soil Management: In terms of EPA Information Bulletin No.105 (IB105) the majority of samples are considered Level 2 Material (Low Level Contaminated Soil) due to chromium and manganese. The soil on site is safe for the intended use, and disposal of soil off site should be in accordance with *IB105*.

GES recommends the following:

- Soil contamination has not been identified at the site through this investigation, and the site is considered safe for intended use at commercial/industrial guidelines, including soil excavation required for the construction of additions to an existing shed.
- Any disposal of soil from the site will need to be in accordance with IB105 and controlled waste guidelines as Level 2 Material.

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3 ABREVIATIONS

AEC	Areas of Environmental Concern
AHD	Australian Height Datum
ALS	Analytical Laboratory Services
ANZECC	Australia and New Zealand Environment and Conservation Council
BGS	Below Ground Surface
BH	Borehole
BTEXN	Benzene Toluene Ethylbenzene Xylene Naphthalene
COA	Certificate of Analysis
COC	Chain of Custody
COPC	Contaminant of Potential Concern
CRC CARE	Corporative Research Centre for Contamination Assessment and Remediation of the Environment
CSM	Conceptual Site Model
DQO	Data Quality Objectives
EOH	End of Hole
EIL	Ecological Investigation Levels
ESL	Ecological Screening Levels
EPA	Environmental Protection Authority
ESA	Environmental Site Assessment
GDA94	Geocentric Datum of Australia 1994
GES	Geo-Environmental Solutions Pty. Ltd.
HIL	Health Investigation Levels
HSL	Health Screening Levels
IL	Investigation Levels
LOR	Limits of Reporting
MDL	Mean Detection Limit
NATA	National Association of Testing Authorities
NEPM ASC	National Environmental Protection (Assessment of Site Contamination) Measure
NHMRC	National Health and Medical Research Council
NL	Non Limiting
NRMMC	Natural Resource Management Ministerial Council
PAH	Polynuclear Aromatic Hydrocarbons
PCP	Physio-Chemical Parameters
PHC	Petroleum Hydrocarbons
PID	Photo-Ionisation Detector
PPA	Preferential (PVI) Pathways Assessment
PVI	Petroleum Vapour Intrusion
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
USCS	Unified Soil Classification System

4 INTRODUCTION

4.1 General

This report presents the findings of an Environmental Site Assessment (ESA) undertaken by Geo-Environmental Solutions Pty. Ltd. (GES) at 115 Cove Hill Road, Bridgewater, Tasmania - hereby referred to as 'The Site'. The Site location is presented in Figure 1 and the aerial photograph is presented in Figure 2. GES was commissioned by Young Group 'The Client', to conduct the site assessment.

The Site is located in a light industrial area on the northern fringes of the suburb of Bridgewater, an area approximately 20km north of Hobart, which has featured light industrial land use over the past 20 years. The ESA has been requested by the client in light of the proposed further commercial development of the site as illustrated in Figure 3.

This ESA has been prepared by a suitably qualified and experience practitioner in accordance with procedures and practices detailed in National Environmental Protection Measure [Assessment of Site Contamination] (NEPM ASC; 2013) guidelines and key regulations and policies identified in the References section of this document. Personnel engaged in preparing this ESA are listed in Appendix 1 along with their relevant qualifications and years of experience.

Figure 1 Site Location (Image C/O the LIST)

4.2 Site Layout

An aerial image of the existing site layout is presented in Figure 2. Proposed developments are presented in Figure 3.

Figure 2 Existing Site Layout (Image C/O The LIST)

Figure 3 Proposed Developments at the site (Image C/O Young Group)

4.3 Site Details

Site details are presented in Table 1.

Table 1 Site Details

SITE LOCATION: 115 Cove Hill Road, Bridgewater, Tasmania, Australia.
INVESTIGATION AREA The Site
SITE ELEVATION & GRADIENT Approximately 40-45 m AHD, modified landform (some disused roads), with average gradient around the site of 2%, fall to the southeast.
SITE SURFACING Wet disturbed surface conditions
TITLE REFERENCES PID 9945127, TR 176216/103
SITE OWNER Cove Hill Road Pty Ltd.
PREVIOUS LANDUSE Agricultural, light industrial
SITE SURROUNDING LAND ZONING *Tasmanian Planning Scheme, Brighton Local Provisions Schedule – Light Industrial*
SITE LAND USE Vacant lot
PROPOSED LAND USE Brighton Industrial Park – warehouses and specialised retail

4.4 Investigation Objectives

The objective of this ESA was to:

Assess the site for any potential contamination from historical use of the site. We have done this in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 16 May 2013 (NEPM ASC 2013). To assess for any human health or environmental risks of the soil present on site.

The client has requested this ESA in due diligence in order to determine the most suitable sites for construction and to identify potential areas of concern that may be affected by contamination resulting from previous land use.

4.5 Scope of Works

The scope of work for this ESA was to:

- Conduct a desktop investigation.
- Conduct a site walkover.
- Excavate twenty five (25) test pits, collect a total of fifty (50) primary soil samples from the test pits; the primary samples were sent for analysis of Total Recoverable Hydrocarbons (TRH), Benzene Toluene Ethylbenzene Xylene Naphthalene (BTEXN), Polynuclear Aromatic Hydrocarbons (PAH), and a suite of 15 metals, to a National Association of Testing Authorities (NATA) accredited laboratory.
- Soil samples were sent with Quality Assurance/ Quality Control (QA/QC) samples including two inter-lab splits and two duplicate split samples and one rinsate blank sample.
- Determine the absence or presence and if present the level of site contamination and compare soil and vapour results against the relevant guidelines.
- Conduct a risk assessment, known as a Conceptual Site Model; and
- Report findings in an Environmental Site Assessment report, detailing specific onsite human health or environmental risk which may source from potentially detected contamination.

5 DESKTOP STUDY

5.1 Site Zoning

The Site is zoned *Light Industrial* under the Tasmanian Planning Scheme, Brighton Local Provisions Schedule. The land use surrounding the Site is *Light Industrial*. Nearby areas are zoned *Rural, Utilities*, *Open Space, General Residential* and *Community Purpose* (Figure 4). The site is to be assessed against land use Class D for commercial/industrial land use.

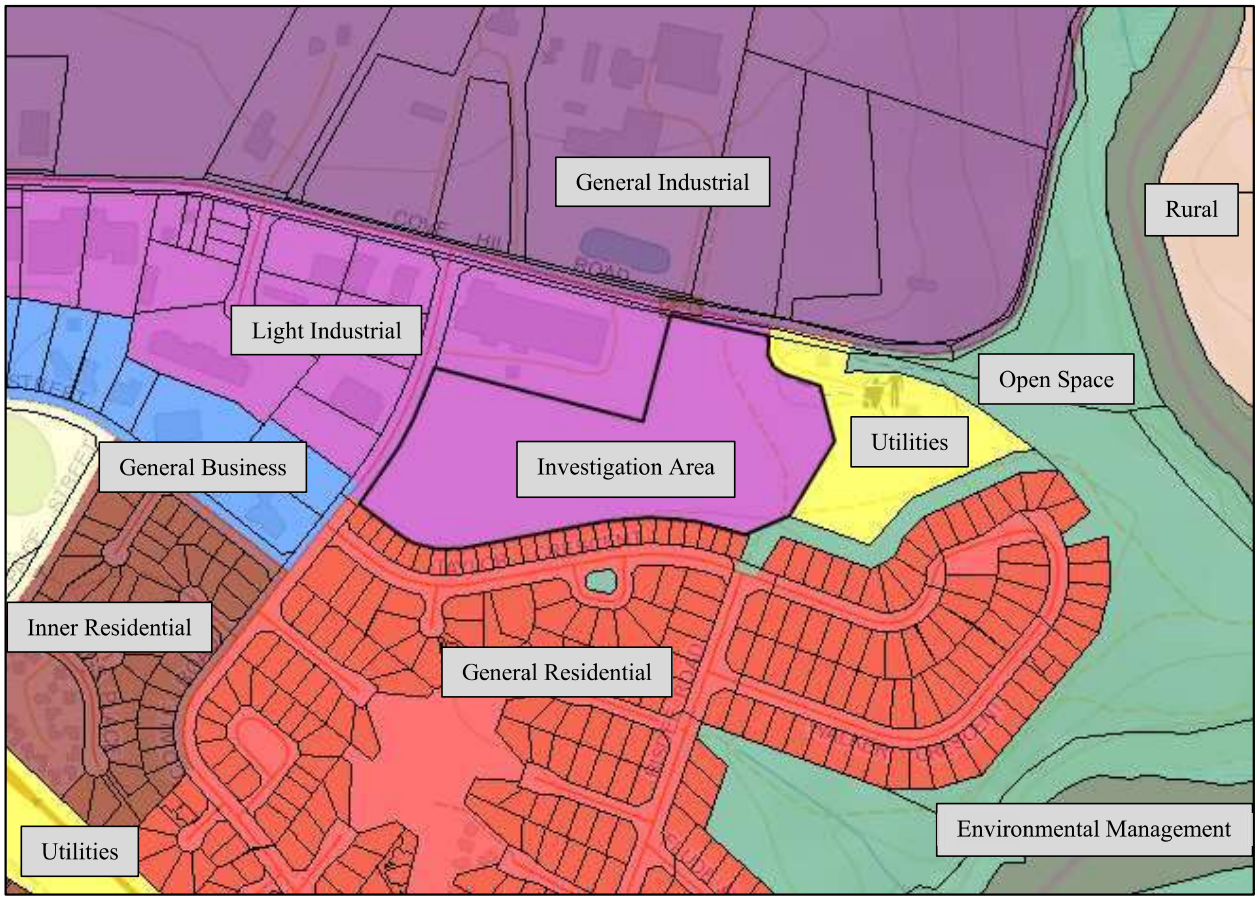


Figure 4 Tasmanian Planning Scheme, Brighton Local Provisions, Zoning

5.2 Site Walkover

A site walkover was completed by GES staff on the 16/08/2022. There were no obvious signs of site contamination such as soil staining or odour observed. Photographs from the site walkover and sampling are presented in Appendix 2 that show site conditions.

5.3 MRT Geology Mapping

The 1:25 000 scale geology map of the Greater Hobart area (see excerpt in Figure 5) shows that the investigation area falls within an extensive Tertiary aged Basalt (Tb) deposit. The following geological units are displayed in Figure 5:

Tb – Basalt (tholeiitic to alkalic) and related pyroclastic rocks

TQ - Undifferentiated Cenozoic sediments

Q - Undifferentiated Quaternary sediments

Jd – Dolerite (tholeiitic) with locally developed granophyre

Rv – Dominantly lithic sandstone with felsic volcaniclastics

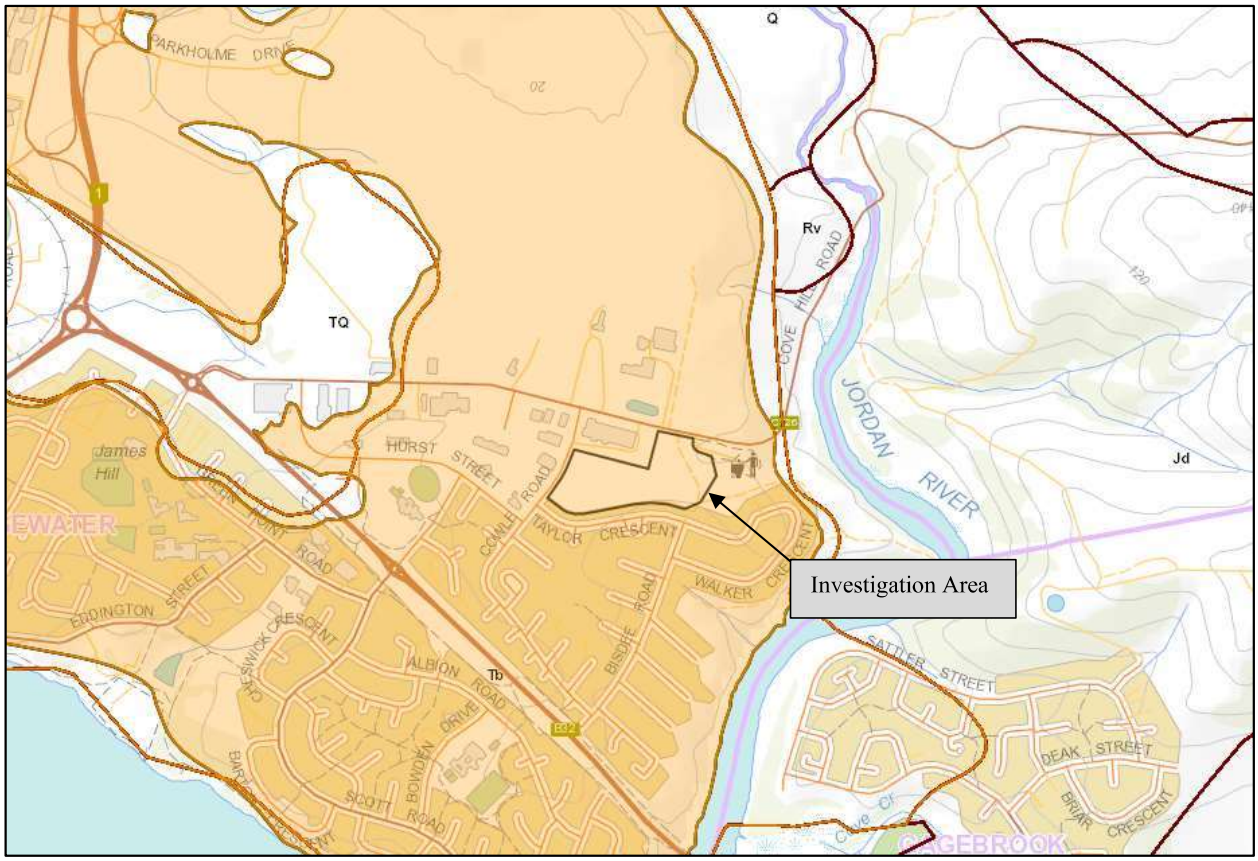


Figure 5 Mineral Resources Tasmania 1:25.000 Scale Mapping.

5.4 Historical Aerial Photography Interpretation

The 1973, 1976, 1982 – 1989, 1992 and 1995 historical aerial photographs, and Google Earth Images from the range 2005 – 2020, were viewed as part of this ESA. The select photographs are presented in Appendix 3.

In summary the following observations can be made from the historical aerial photographs, historical photographs, and maps:

1973 - 1976 – The area features agriculture/grazing land use with minor roads confined largely to the southwest portion of the lot.

1982 - A higher resolution image shows new minor roads constructed across the site. Residential houses have been constructed to the south.

1984 - 1986 – Similar conditions to 1982 image. The site itself remains vacant land. Vehicular activity appears to be becoming more extensive at 131 Cove Hill Road. This may represent the transition to light industrial use such as waste management.

1987 – A small shed or container has been established at 131 Cove Hill Road, and a hardstand that appears to be a tip. The ground appears to be cultivated in several areas with fill visible on the southeast of the developed area. Development is currently confined to 131 Cove Hill Road.

1988 – Area where fill or rubbish was first detected at 131 Cove Hill Road has been levelled and is evident of landfill. Small areas of rubbish are still visible. Neighbouring properties in the vicinity of lots 114-120 appear to contain wrecked vehicles and unidentified stockpiled materials and appear to be operating an auto wrecking company.

1992 - 1995 – Established landfill area and waste transfer station at 131 Cove Hill Road appears to be continued operation.

2005 – The lots to the north appear to have filled large areas previously used for stockpiling auto waste. This may be evident of landfill or processing of waste with off-site disposal. This may be evident of the transition into the current Porta Mouldings Pty Ltd sawmill operations that are still in use at 114 Cove Hill Road. Waste management appears to be now limited to the lot at 120 Cove Hill Road. The Site appears to have similar conditions as observed through the 1990s and remains undeveloped.

2009 – A large shed has been constructed immediately next to the Site at 113 Cove Hill Road. This is operated by Polyfoam Australia where polystyrene boxes are manufactured and distributed.

2010 – 2020 – no further development on The Site, adjacent residential development increasing in density. Waste transfer station at 131 Cove Hill Road is managed by Council and the waste (potentially auto wrecking) operations continue at 120 Cove Hill Road, which appears to be established in 2011. The Site remains undeveloped.

Concluding points;

The Site has been predominantly used for grazing prior to the 1980s. Concentrated development and areas of debris suggests managed dumping of rubbish immediately adjacent to the Site and uncontrolled fill in the vicinity while the waste transfer station is developed, becoming more apparent through the late 1980s.

Potentially contaminating activities identified for this Site include; disposal of unidentified materials in the vicinity of the Site, and possibly uncontrolled fill on site.

5.5 Correspondence Regarding Site Contamination

The client has requested this ESA in due diligence given that potentially contaminating activities may have occurred on the Site in previous land use.

GES received correspondence from EPA on 24/07/2022 regarding potential contamination at 115 Cove Hill Road and 131 Cove Hill Road. It was stated that the EPA holds no files regarding contamination at 115 Cove Hill Road and holds no records of landfill operations at 131 Cove Hill Road.

Brighton Council responded 09/08/2022 and determined that there are no records on file of reported contamination at 115 Cove Hill Road.

5.6 WorkSafe Tasmania Dangerous Goods Records

A preliminary enquiry to WorkSafe Tasmania (WST) for dangerous goods/substances database for the Site revealed there was no file for the site. As there is no evidence of storage of dangerous goods on the Site, a search of WST dangerous goods records was deemed not applicable.

5.7 Environment Protection Authority records

The EPA Regulated Premises layer and Underground Petroleum Storage Systems (UPSS) layers were accessed from The LIST and presented in Figure 6. The nearest upgradient Regulated Premises (dark green pin) is the Porta Mouldings Pty Ltd sawmill at 114 Cove Hill Road and is approximately 240m north of the Site. The nearest UPSS (light green pin) is 560m to the southwest of the Site and is downgradient of the Site.

Figure 6 EPA Regulated Premises and registered UPSS

5.8 Site Topography, Drainage & Hydrogeology

The Site features lightly modified topography, with some flat pad areas previously excavated and containing fill material. The average slope angle over the greater area surrounding the investigation area is a gentle 2-3% to the southeast.

Groundwater and surface water is inferred to follow the local topography and travel southeast down to Jordon River.

Groundwater was not encountered during the excavations at the site.

The inferred groundwater and surface water flow directions are illustrated in Figure 7.

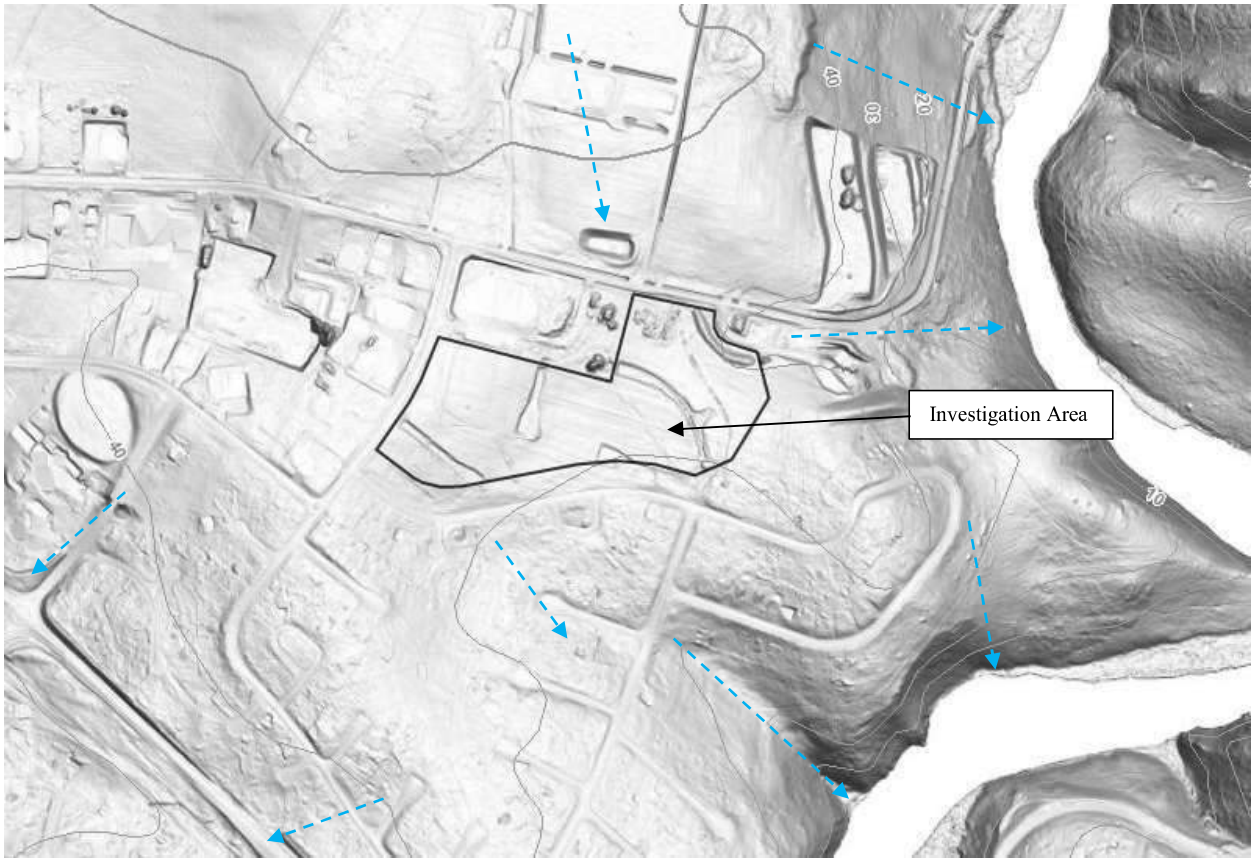


Figure 7 Contour Elevations and Inferred Surface and Groundwater Flow Direction

5.9 Groundwater

5.9.1 Potential Up-Gradient Contamination Sources

The land upgradient of the Site is zoned Light Industrial, it features; Porta Mouldings Pty Ltd at 114 Cove Hill Road, and the Polyfoam factory at 113 Cove Hill Road. The adjacent waste transfer station at 131 Cove Hill Road is downgradient of the Site. Potentially contaminating activities upgradient of the site could affect groundwater at the Site.

5.9.2 Downgradient Ecosystem Receptors

The closest ecological receptor is a minor tributary to the southeast of the Site that feeds into the Jordan River, which is approximately 300m from the Site at its closest point. There is no evidence of unmapped drainage channels within the Site.

5.9.3 Registered Water Bores

There are no downgradient water bores that could be affected by the Site, and no water bores directly upgradient of the Site. The nearest registered water bore is 1.7 km away to the northwest, and within a different watershed. (DPIPWE groundwater information access portal, 2022). Water bores accessing water for potential stock feeding water and potential drinking water will not be considered further in this ESA.

5.9.4 Acid Sulfate soils

According to the Land Information Service Tasmania (LIST) database, there are no Potential Acid Sulfate Soils (PASS) on the site, and the nearest (low risk) PASS is approximately 600m northwest of the investigation area.

5.10 Potential Contamination Issues

5.10.1 Areas of Potential Concern

The Site is considered an area of potential concern due to the following potential contamination pathways.

- Uncontrolled fill on site. Fill of undetermined origins is present.
- Transportation of contaminants from upgradient light industrial area onto the site.
- Storage and recycling of materials including contaminated soil on the property directly downgradient of the site.
- Vehicle/machinery use and vehicle/machinery storage on the site.

5.10.2 Contaminants of Potential Concern

Contaminants of potential concern (COPC) that have been considered for the sake of this investigation is a suite of typical light industrial contaminants, and includes the following:

- Total Petroleum/Recoverable Hydrocarbons (TPH/TRH);
- Mono Aromatic hydrocarbons: Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene (BTEXN);
- Polynuclear Aromatic Hydrocarbons (PAHs); and
- A suite of 15 metals.

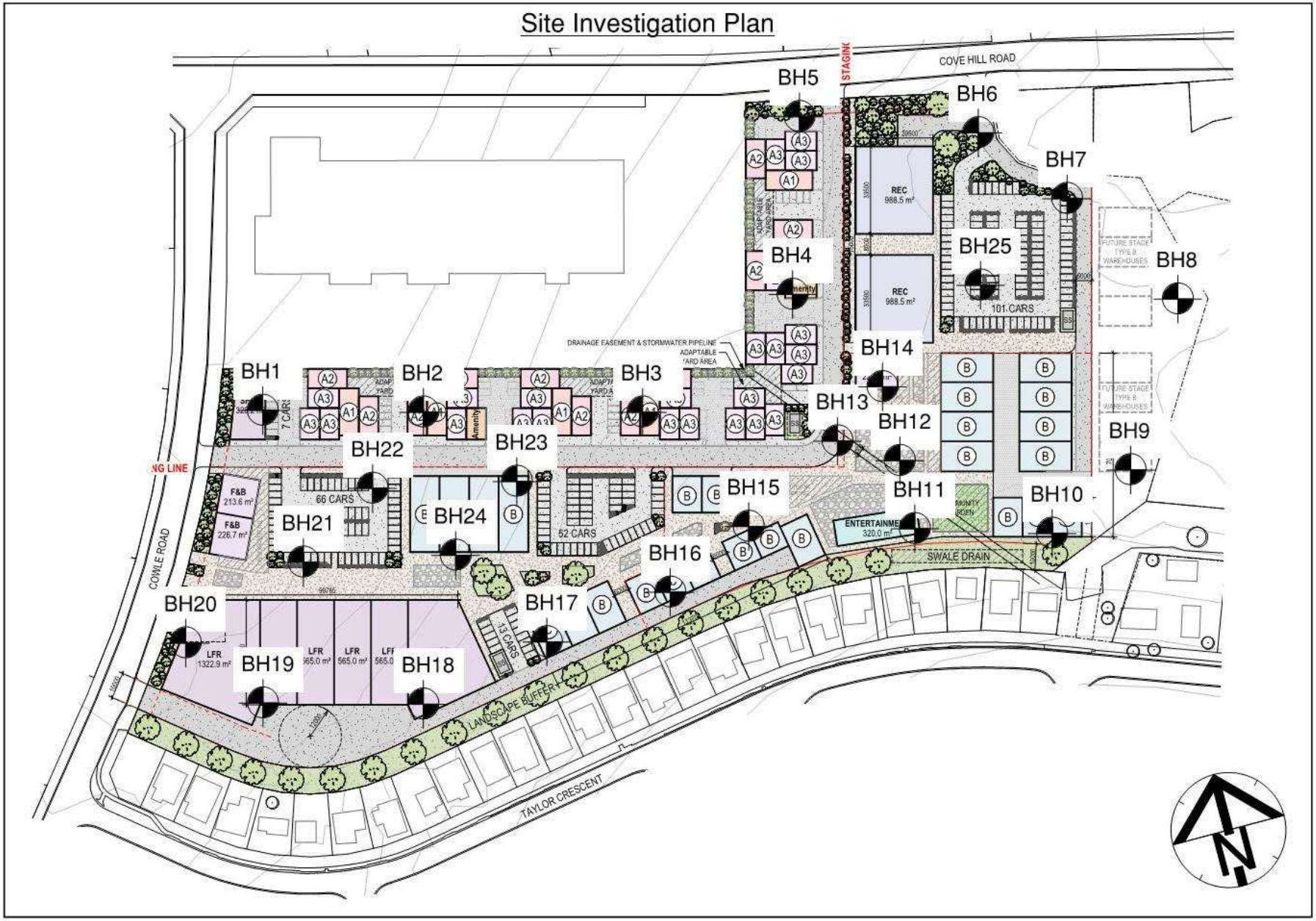
6 FIELD INVESTIGATION PROCEDURES

6.1 Works Summary

Site investigation works comprised of; site walkover, bore hole drilling, and soil sampling, which is summarised in Table 2 and Appendix 4. See Site Investigation Plan for bore hole locations

Table 2 Summary of Site Investigation Work Dates

Scope	Date	Lab Report	Details
Site walkover. Acquire soil samples from drilled bore holes.	16/08/2022	EM2215963	50 primary samples (28 analysed), 2 lab-split samples, two duplicate samples and 1 rinsate blank sample, collected and sent for analysis.


Site Investigation Plan
COVE HILL ROAD
COWLE ROAD
TAYLOR CRESCENT
BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10
BH11
BH12
BH13
BH14
BH15
BH16
BH17
BH18
BH19
BH20
BH21
BH22
BH23
BH24
BH25
REC 988.5 m²
101 CARS
66 CARS
52 CARS
12 CARS
F&B 213.6 m²
F&B 226.7 m²
LFR 1322.9 m²
SWALE DRAIN
LANDSCAPE BUFFER
DRAINAGE EASEMENT & STORMWATER PIPELINE
FUTURE STAGE TYPE B WAREHOUSES
N

6.2 Soil Investigation

6.2.1 Test holes

A total of 25 boreholes were drilled to depths of 0.70, generally encountering basalt bedrock at depths of 0.4 – 0.5m BGS.

Samples were taken by hand with disposable nitrile gloves, hence there is no potential cross contamination from sampling equipment.

The observed fill was approximately 0.10m deep on the downgradient edge of the investigation area (bore holes 12, 13 & 14). Soils were typically comprised of highly plastic clays with stones and gravel increasing with depth which is characteristic of the region.

6.2.2 Soil Sampling

Soil sampling was conducted per the National Environmental Protection Measure (NEPM ASC 2013) and AS4482 sampling guidelines. Table 3 presents a summary of the soil assessment methodology adopted at the Site.

Table 3 Summary of Soil Sampling Methods

Activity	Details / Comments
Drilling Method	Geoprobe – macro core
Soil Logging	Logging the soil was conducted in accordance with the unified soil classification system (USCS) as detailed in AS1726 (1993).
Decontamination of Sampling Equipment	Disposable nitrile gloves were used for sampling, hence no potential for cross contamination of sampling equipment.
Soil Screening	In accordance with AS4482.2. Individual soil samples were collected at 0.5 intervals below ground surface (BGS) and/or change in geology. As no hydrocarbon odour was discerned, screening samples for volatile fractions using a PhotoIonisation Detector (PID) was deemed not necessary.
Laboratory Soil Sample Collection	In accordance with AS4482.2. All samples were collected using disposable nitrile gloves. Samples were selected for laboratory analysis at the following depths below ground surface (BGS); ILS-1 0.10m BGS; ILS-2 0.10m BGS; DUP-1 0.10m BGS; DUP-2 0.10m BGS; A minimum number of samples were carefully selected which would provide enough information to delineate soil contamination.
Sample preservation	Samples were placed into a jar for laboratory analysis. Soil jars were placed in a pre-chilled cool box with ice bricks.
Sample holding times	Sample holding times did not exceeded acceptable range (based on NEPM ASC B3-2013), time from collection to extraction.

6.2.3 Soil Analysis

Primary and QC samples were submitted to Analytical Laboratory Services (ALS), Springvale, Melbourne for analysis. A total of 50 primary samples were selected for analysis. Chain of Custody (COC) documentation was completed and is provided in Appendix 5 along with the Sample Receipt Notification (SRN) for each batch. Table 4 presents a summary of the laboratory analyses undertaken.

Table 4 Overview of Soil Analysis and Quality Control

Analytes	Primary Samples	Duplicate[a]	Interlab	Rinsate Blank[c]
TPH	25	2	1	1
BTEXN	25	2	1	1
PAH	25	2	1	1
Metals	25	2	1	1

Sampling Quality Control Standards (AS4482):
a – Duplicate one (1) in twenty (20) primary samples
b – Inter-lab duplicate split sample one (1) in twenty (20) primary samples
c – Single rinse sample per piece of equipment per day

7 QUALITY CONTROL

All Field and laboratory Quality Assurance and Quality Control (QA/QC) details and outputs are presented in Appendix 6.

7.1 Field

It is standard to expect up to 10% error in field duplication and up to 10% laboratory error. Therefore, in theory up to 20% error can be assumed on duplicate analysis. Some variation may exist in soil and groundwater because even though all efforts are made to split samples homogeneously, fragments of materials may bias samples in certain elements.

Relative Percentage Differences (RPDs) for the duplicate samples where applicable are calculated using the method outlined below.

The acceptance criteria used for the RPDs depend on the levels of contaminants detected and the laboratory's Method Detection Limits. The closer the levels detected are to the MDL the greater the acceptable RPD. RPDs are calculated as follows:

- RPD <50% for low level results (<20 * MDL)
- RPD <30% for medium level results (20-100 * MDL)
- RPD <15% for high level results (>100 * MDL)
- No limit applies at <2 * MDL (Method Detection Limit)

Field QA/QC procedures and compliance are summarised in Table 5

Table 5 Field QA/QC procedures and Compliance

QA/QC Requirement	Compliance	Comments
Appropriate sampling strategy used and representative samples collected	Yes	Sampling program was undertaken in accordance with AS4482.1-2005
Appropriate and well documented sample collection, handling, logging and transportation procedures.	Yes	Appropriate and well documented
Decontamination	Yes	As samples were collected with disposable nitrile gloves (refreshed for each sample), there was no cross contamination risk identified.
Chain-of-custody documentation completed	Yes	COC were completed in accordance with NEPM ASC Schedule B2, Section 5.4.5 and transported under strict COC procedures. The signed COC documents are included in this report, which includes the condition report on arrival of samples to the Laboratory, cross checking of sample identification and paperwork and preservation method.
Required number of splits: Duplicate & inter-lab splits: 1 per 20 primary samples	No	One duplicate sample was collected and tested for a total of 6 primary samples, as per AS4482.1-2005. An inter-laboratory split sample was not collected.
QA/QC samples reported RPD's within indicated MDL guidelines.	No	For Duplicate and TP3 0.5m pairs, 98% of analytes complied.
Required numbers of rinse blank samples collected with no laboratory detections?	Yes	One rinse blank sample was collected as per AS4482.1-2005.
Trip blanks collected with no laboratory detections?	NA	According to AS4482.2-1999, at least two or more soil trip blanks are required where volatile hydrocarbons are discernible. As volatile hydrocarbons were not discernible, this was not required.
Field blanks collected with no laboratory detections?	NA	According to Australian Standards, there is no requirement to collect field blanks, unless there is concern with cross contamination risks.
Samples delivered to the laboratory within sample holding times and with correct preservative	Yes	All samples were sent to the laboratory with correct preservative, and within required holding time.

7.2 Laboratory

Soil laboratory QA/QC procedures and compliance are summarised in Table 6. The full QCI reports for EM2124453 are presented in Appendix 6.

Table 6 Laboratory QA/QC Procedures and Compliance

QA/QC Requirement	Compliance	Comments
All analyses NATA accredited	Yes	ALS Laboratories is NATA Accredited. Appropriate analytical methods used, in accordance with Schedule B(3) of the NEPM ASC 2013. Acceptable laboratory limits of reporting (LORs) adopted.
Method Blanks: zero to <Practical Quantitation Limit (PQL)	Yes	There were no method blank value outliers in the QCI report.
Laboratory Control Samples: 70% to 130% recovery for soil.	Yes	There were no laboratory control outliers in the QCI report.
Matrix spikes: 70% to 130% recovery for organics or 80%-120% recovery for inorganics	Yes	There were no matrix spike outliers in the QCI report.
Duplicate Samples: 0% to <20% RPD.	Yes	There were no duplicate sample RPD outliers in the QCI report.
Surrogates: 70% to 130% recovery	Yes	There were no surrogate recovery outliers in the QCI report.
Analysis holding time outliers	Yes	There were no analysis holding time exceedances in the QCI report.
Quality Control Sample Frequency Outliers	No	For EM2124453 QCI Report: For NEPM 2013 B3 & ALS QC Standard. Matrix Spikes; PAH/Phenols; Laboratory Duplicates 0, expected 5, TRH – Semivolatile Fraction; Laboratory Duplicates 0, expected 5. Laboratory Duplicates; PAH/Phenols; Laboratory Duplicates 0, expected 10, TRH – Semivolatile Fraction; Laboratory Duplicates 0, expected 10.

8 FIELD INVESTIGATION

8.1 Soil Bores

8.1.1 Geological Interpretation

The geology of the investigation area appears to be consistent with the geological unit of Tertiary basalt which is mapped across the entirety of the Site (see Section 2.3). Bore holes were shallow and were typically <0.5m deep, with a maximum depth of 0.70m. See Appendix 4 for bore hole logs.

8.1.2 Grain & Depth Class Interpretation

Grain size classifications are applied to all soils at the Site to determine threshold screening level concentrations for hydrocarbons to assess soil ecological and human health risks.

Grain class threshold values are determined based on either the:

- sample grain size (in the case of ecological screening levels or chromium limits); or
- average grain class overlying the sample point (when assessing petroleum vapour screening levels) relative to the proposed finished floor level.

Table 7 provides a summary of the grain class averages for material overlying the sample.

Table 7 Summary of Grain Class Based on USCS Classification

Sample	Footing Excavation Depth^ - Red Fill Thickness^ - Green	Sample PVI Depth (m) Relative to Slab/Cut Depth	Soil Grain Size Class Averaging Above Soil Sample																	Crawl Space Thickness (m)	Attenuation			Petroleum Vapour Intrusion HSL Grain Class*	SAMPLE USCS
			GW	GP	GM	GC	SW	SP	SM	SC	ML	CL	OL	MH	CH	OH	CI	Rock (R)	Existing Pavement (P)		Proposed CONCRETE (CH)	Crawl Space	Biodegradation		
BH1 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH2 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH3 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH4 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH8 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH5 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH6 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH7 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH9 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH10 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH11 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH12 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	CH
BH13 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	CH
BH14 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	CH
BH15 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH16 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH17 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH18 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH19 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH20 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH21 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH22 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH23 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH24 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC
BH25 0.10	0.5	<																		NA	0.1	1.0	1.0	CLAY	SC

Footnotes:
* Grain class is modified based on proposed building construction: concrete is interpreted to have similar vapour intrusion properties to clay and is therefore designated as CLAY within the grain size averaging assessment; backfill is inferred to comprise of gravel (GW)
< Sample has been collected from above the proposed excavation (base of slab or proposed ground level) and is not relevant in PVI risk assessment

^ Excavation depths are approximate and may vary due to change in services depths or overall building/footing construction design

8.1.3 Soil Contamination Observations

No soil contamination observations at the site such as; odour, staining or denuded vegetation. No groundwater was encountered.

9 SOIL ECOLOGICAL IMPACT ASSESSMENT

9.1 Protected Environmental Values

The requirement for protecting soil from contaminated activities in Tasmania is managed under the Environmental Management and Pollution Control Act 1994 (EMPCA) which states in Part 5A:

(2) An area of land is a contaminated site if –

(a) there is in, on or under that area of land a pollutant in a concentration that –

(i) is above the background concentration; and

(ii) is causing or is likely to be causing serious or material environmental harm or environmental nuisance, or is likely to cause serious or material environmental harm or environmental nuisance in the future if not appropriately managed;

Potential soil impact at the site is assessed through application of the following environmental investigation guidelines.

9.2 NEPM ASC (2013) Guidelines

The following ecological investigation guidelines are to be addressed in order to assess acceptable levels of risk to terrestrial ecosystems:

- NEPM ASC (2013) Ecological Investigation Levels (EIL's) – have been developed for selected metal and organic substances. EIL's depend on specific soil and physicochemical properties and land use scenarios and generally apply to the top two (2) metres of the soil profile (NEPM ASC 2013);
- NEPM ASC (2013) Ecological Screening Levels (ESL's) – have been developed for selected petroleum hydrocarbon compounds and total petroleum hydrocarbon fractions. ESL's broadly apply to coarse- and fine-grained soils and various land use scenarios within the top two (2) metres of the soil profile (NEPM ASC 2013).

Soil analytical results are compared against ESL and EIL limits presented in Table 8.

Table 8 Summary of Soil Contaminates Considered as part of this investigation, based on NEPM (2013) ASC

Investigation Levels (IL)	**Analytes Investigated**						
	Hydrocarbons				**Metals**		**DDT**
	BTEX	**TRH (F1 to F4)**	**Benzo(a) pyrene (PAH)**	**Naphthalene (PAH)**	**Zn, Cu, Cr(III), Ni & As**	**Lead**	
ESL's	Analysed	Analysed	Analysed				
EIL's				Analysed	Analysed	Analysed	Not Analysed

9.3 Guidelines

9.3.1 Ecological Screening Levels

The following compounds were compared against NEPM ASC (2013) Ecological Screening Levels (ESL's):

- BTEX;
- F1 to F4 TRH; and
- Benzo(a)pyrene (PAH)

Selection of ESL threshold investigation limits are set out in the NEPM ASC (2013) guidelines and require classification of the soil according to:

- Land use sensitivity:
    - Areas of ecological significance
    - Urban residential and public open space; and
    - Commercial and industrial.

- Dominant particle size passing through a 2 mm sieve into:
    - Coarse – sand sizes and greater; and
    - Fine – clay and silt sizes.

Adopted NEPM ASC (2013) soil and land use classifications are presented below.

9.3.2 Ecological Investigation Levels

The following compounds were compared against Environmental Investigation Levels:

- Copper;
- Nickel;
- Zinc;
- Chromium;
- Lead;
- Arsenic; and
- Naphthalene.

There was a requirement to classify the soil according to physicochemical properties to develop investigation limits for the above listed compounds. Adopted physicochemical parameters are presented in the results tables.

Selection of EIL threshold investigation limits are set out in the NEPM ASC (2013) guidelines and require classification of the soil per specific soil and physicochemical properties which are presented in the results tables. The adopted land use scenarios presented in Table 9. As the tributary present on site flows downgradient to join Grasstree Hill Rivulet in a suburban/residential area, urban residential land use scenario can be adopted for nearby ecological receptors.

Table 9 Adopted Land Use Scenario for the Soil Bores

Land Use Scenario	Applicable Soil Bores
Areas of Ecological Significance	
Urban Residential & Public Open Space	*Downgradient of the site*
Commercial & Industrial	*All soil bores*

Based on a preliminary assessment of site soil conditions, the following physicochemical properties are applied to assess guideline EIL's:

- Clay content consistent with field observations;
- A soil pH and cation exchange capacity (CEC) consistent with Table 10.

Table 10 Cation Exchange and Clay content, Adopted for the Site

Soil Physicochemical Properties			
USCS	Clay %	CEC	pH
R	100	10	4.5
GW	0	10	4.5
GP	0	10	4.5
GM	10	15	4.5
GC	30	20	4.5
SW	0	10	4.5
SP	0	10	4.5
SM	10	15	4.5
SC	20	20	4.5
ML	30	20	4.5
CL	100	35	4.5
OL	40	35	4.5
MH	30	35	4.5
CH	80	45	4.5
OH	100	60	4.5
PT	100	80	4.5
P	0	0	4.5
CM	60	35	4.5
CI	60	35	4.5
Rock	0	10	4.5

9.4 Findings

9.4.1 Ecological Screening Levels

Laboratory analytical results are presented in Appendix 7. Table 11 compares soil analytical results against relevant NEPM ASC (2013) ESL's. Concentrations which exceeded laboratory limit of reporting (LOR) are highlighted in bold, ESL exceedances would be highlighted with a coloured cell.

There were low level detections of hydrocarbons, with no exceedances of ESL guideline limits for commercial/industrial land use.

Table 11 Summary of Soil Analytical Results Compared with ESL's for urban land use.

NEPM Ecological Screening Levels for Soil				BTEX				PAH	TRH			
Bold - Indicates LOR Exceedances X - Indicates Sample has been Excavated				Benzene	Toluene	Ethylbenzene	Xylenes	Benzo(a)pyrene	F1 (C6 - C10)	F2 (>C10 - C16)	F3 (>C16 - C34)	F4 (>C34 - C40)
Colour Shading - Indicates ESL Exceedances: >1 x, * 2-5 x, ** 5-20 x, *** 20-50 x, **** >50 x												
Sample ID	Sample Date	Soil Texture Class (fine /coarse)	Land Use	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				LOR 0.2	LOR 0.5	LOR 0.5	LOR 0.5	LOR 0.5	LOR 10	LOR 50	LOR 100	LOR 100
BH1 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH2 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH3 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH4 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH8 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH5 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH6 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH7 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH9 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH10 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH11 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH12 0.10 X	16/8/22	F	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH13 0.10 X	16/8/22	F	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH14 0.10 X	16/8/22	F	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH15 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH16 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH17 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH18 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH19 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	**110**	<100
BH20 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH21 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH22 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	**130**	<100
BH23 0.10 X	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH24 0.10	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH25 0.10	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
Duplicate 1	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
Duplicate 2	16/8/22	C	COM/IND	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
INTER-LAB SPLIT 1	16/8/22	C	COM/IND	< 0.1	< 0.1	< 0.1	< 0.3	<0.5	< 20	< 50	< 100	< 100
INTER-LAB SPLIT 2	16/8/22	C	COM/IND	< 0.1	< 0.1	< 0.1	< 0.3	<0.5	< 20	< 50	< 100	< 100

9.4.2 Ecological Investigation Levels

Laboratory analytical results are presented in Appendix 7. Table 12 compares soil analytical results against relevant EIL's. Concentrations which exceeded laboratory LOR would be reported in the table, EIL exceedances would be highlighted with a coloured cell. There were no exceedances of EIL guidelines at commercial/industrial land use.

Table 12 Soil Analytical Results Compared Against Ecological Investigation Levels at urban land use

NEPM Ecological Investigation Levels for Soil **Bold - Indicates LOR Exceedances** X - Indicates Sample Within Inferred Excavation Colour Shading - Indicates EIL Exceedances: >1 x, * 2-5 x, ** 5-20 x, *** 20-50 x, **** >50 x						Copper (CEC)	Copper (pH)	Nickel	Zinc	Chromium III	Lead	Arsenic	DDT	Naphthalene
Sample ID	Sample Date	EIL Land Use Sensitivity Class	Soil CEC (cmolc/kg)	Soil pH	Soil Texture Class (fine /coarse)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH1 0.10 X	16/8/22	COM/IND	20	6 (3)	C	20	20	41	100	77	10	<5		<1
BH2 0.10 X	16/8/22	COM/IND	20	6 (3)	C	20	20	47	61	80	6	<5		<1
BH3 0.10 X	16/8/22	COM/IND	20	6 (3)	C	17	17	34	83	72	9	<5		<1
BH4 0.10 X	16/8/22	COM/IND	20	6 (3)	C	17	17	46	68	77	6	<5		<1
BH8 0.10 X	16/8/22	COM/IND	20	6 (3)	C	20	20	48	78	84	8	<5		<1
BH5 0.10 X	16/8/22	COM/IND	20	6 (3)	C	18	18	37	82	72	11	<5		<1
BH6 0.10 X	16/8/22	COM/IND	20	6 (3)	C	18	18	28	89	50	16	<5		<1
BH7 0.10 X	16/8/22	COM/IND	20	6 (3)	C	36	36	32	72	52	13	<5		<1
BH9 0.10 X	16/8/22	COM/IND	20	6 (3)	C	18	18	40	55	76	8	<5		<1
BH10 0.10 X	16/8/22	COM/IND	20	6 (3)	C	30	30	33	80	52	11	<5		<1
BH11 0.10 X	16/8/22	COM/IND	20	6 (3)	C	14	14	37	54	61	6	<5		<1
BH12 0.10 X	16/8/22	COM/IND	45	6 (3)	F	24	24	54	70	82	6	<5		<1
BH13 0.10 X	16/8/22	COM/IND	45	6 (3)	F	20	20	52	78	94	7	<5		<1
BH14 0.10 X	16/8/22	COM/IND	45	6 (3)	F	28	28	63	75	78	6	<5		<1
BH15 0.10 X	16/8/22	COM/IND	20	6 (3)	C	17	17	38	100	72	10	<5		<1
BH16 0.10 X	16/8/22	COM/IND	20	6 (3)	C	24	24	57	84	109	6	<5		<1
BH17 0.10 X	16/8/22	COM/IND	20	6 (3)	C	20	20	51	92	100	7	<5		<1
BH18 0.10 X	16/8/22	COM/IND	20	6 (3)	C	20	20	50	93	92	7	<5		<1
BH19 0.10 X	16/8/22	COM/IND	20	6 (3)	C	22	22	51	130	86	11	<5		<1
BH20 0.10 X	16/8/22	COM/IND	20	6 (3)	C	16	16	41	59	86	<5	<5		<1
BH21 0.10 X	16/8/22	COM/IND	20	6 (3)	C	19	19	44	68	80	6	<5		<1
BH22 0.10 X	16/8/22	COM/IND	20	6 (3)	C	20	20	38	110	64	10	<5		<1
BH23 0.10 X	16/8/22	COM/IND	20	6 (3)	C	17	17	38	80	75	8	<5		<1
BH24 0.10	16/8/22	COM/IND	20	6 (3)	C	12	12	30	72	57	7	<5		<1
BH25 0.10	16/8/22	COM/IND	20	6 (3)	C	16	16	42	64	74	8	<5		<1
Duplicate 1	16/8/22	COM/IND	#N/A	#N/A	C						7	<5		<1
Duplicate 2	16/8/22	COM/IND	#N/A	#N/A	C						7	<5		<1
INTER-LAB SPLIT	16/8/22	COM/IND	#N/A	#N/A	C						10	< 2		< 0.5
INTER-LAB SPLIT	16/8/22	COM/IND	#N/A	#N/A	C						14	< 2		< 0.5

pH Designation:
(1) Using 0.01M CaCl2 extract. Rayment, G.E. and Lyons, D.J. (2011). "Soil Chemical Methods – Australasia". 495+20 pp. CSIRO Publishing, Melbourne.
(2) pHF (1:5). Adjusted by subtracting 0.75 with +/- 0.25 error to calibrate to the CaCl2 method (per comm. ALS Brisbane Acid Sulphate Soils Laboartory). Methods in accordance with Ahern, C.R., Stone Y., and Blunden B. (1998b). 'Acid Sulfate Soils Assessment Guidelines'. Acid Sulfate Soils Management Advisory Committee, Wollongbar, NSW, Australia.
(3) Classified in accordance with parent material typical soil pH as per the Tasmanian soils database

10 SOIL HUMAN HEALTH DIRECT CONTACT ASSESSMENT

10.1 Guidelines

Guidelines presented are based on potential exposure of human receptors to soil impact which may include:

- Trench workers repairing or building services (typically to 1 m BGS). This classification is not dependent on the land use class.
- Onsite workers which may be exposed to potential shallow soil impact in non-paved areas of the site; and
- Onsite excavation works which may include basement carparks and deep foundations.

10.1.1 Land Use Classification

The NEPM ASC (2013) guidelines have been referenced to ensure that the correct land use and density category has been adopted for the site and the surrounding properties (where applicable). As per NEPM ASC 2013 guidelines, the adopted land use class is dependent on the building density and the opportunity for soil access by site occupants (exposure to potentially impacted soil). Aspects needing to be considered include:

- Whether the site is of sensitive land use such as a childcare centre, preschool, primary school or aged care facility in which case land use Class A is applicable;
- The percentage of paved area to determine direct contact exposure risk and therefore classification as low or high density; and
- Classification based on residential, recreational or commercial/industrial setting.

10.1.2 Adopted Land Use Classification

The adopted land use class is presented in Table 13. Land use class is based on the opportunity for soil access as per NEPM ASC 2013 guidelines. Soil access is anticipated to include current and future commercial/industrial site users, future potential construction workers, and trenchworks on site.

Table 13 Summary of Land Use Setting and Density for Determining Exposure Risk

Soil Bores	Construction Phase	Location	Land Use	Pathway	Land Use Class
All soil	During	Site	Construction workers and trench workers	ALL	D and trench worker specific
		Offsite	Neighbouring light industrial workers	DI	D
	Post	Site	Future trench workers	ALL	D and trench worker specific
			Future light industrial workers	ALL	D

DC – Dermal Contact - Trench Worker Guidelines (CRC CARE 2013)
DI – Dust Inhalation - HIL Guidelines (NEPM ASC 2013)
SI – Soil Ingestion - HIL Guidelines (NEPM ASC 2013)
ALL – All of above

10.1.3 Health Investigation & Screening Levels

The main exposure pathways and methods for assessing heath risk from contaminated soils are presented in Table 14.

Table 14 Summary of Exposure Pathways and Preliminary (Tier 1) Methods for Assessing Human Exposure Risk

Exposure Scenario	Contaminant Type	Tier 1 Assessment Method	Reference
Vapour Inhalation – Indoor (PVI)	Petroleum Hydrocarbons including BTEXN	HSL's (addressed in PVI sections)	NEPM ASC (2013)
Vapour Inhalation – Trench (PVI)			CRC CARE (Friebel & Nadebaum, 2011)
Dermal Contact		HSL's	
Dust Inhalation	PAH's	Health Investigation Levels (HIL's)	NEPM ASC (2013)
Soil Ingestion			

PVI – Petroleum Vapour Intrusion

10.2 Findings

10.2.1 Dermal Contact - Petroleum Hydrocarbons

Laboratory analytical results are presented in Appendix 7. Table 15 presents soil hydrocarbon analytical results compared against CRC CARE (Friebel & Nadebaum, 2011) HSL guidelines for assessing dermal contact risk. Concentrations which exceeded laboratory LOR are highlighted in bold, HSL exceedances would be highlighted with a coloured cell indicating the highest HSL land used class which is exceeded.

There were no guideline exceedances for dermal contact and no dermal contact risk identified at commercial/industrial land use levels.

Table 15 Soil Analytical Results Compared Against CRC CARE (Friebel & Nadebaum, 2011) Guidelines for Dermal Contact

CRC CARE Health Screening Level Dermal Contact Hazard from Soil Hydrocarbons'		EP080: BTEXN					EP080/071: TRH			
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	C6 - C10 Fraction	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		0.2	0.5	0.5	0.5	1	10	50	100	100
HSL A Low Density Residential		100	14000	4500	12000	1400	4400	3300	4500	6300
HSL B High Density Residential		140	21000	5900	17000	2200	5600	4200	5800	8100
HSL C Recreational		120	18000	5300	15000	1900	5100	3800	5300	7400
HSL D Commercial/Industrial		430	99000	27000	81000	11000	26000	20000	27000	38000
Intrusive Maintenance Worker		1100	120000	85000	130000	29000	82000	62000	85000	120000
Date	Sample									
16/08/2022	BH1 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH2 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH3 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH4 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH8 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH5 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH6 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH7 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH9 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH10 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH11 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH12 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH13 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH14 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH15 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH16 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH17 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH18 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH19 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	**110**	<100
16/08/2022	BH20 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH21 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH22 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	**130**	<100
16/08/2022	BH23 0.10 X	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH24 0.10	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	BH25 0.10	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	Duplicate 1	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	Duplicate 2	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
16/08/2022	INTER-LAB SPLIT 1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.5	< 20	< 50	< 100	< 100
16/08/2022	INTER-LAB SPLIT 2	< 0.1	< 0.1	< 0.1	< 0.3	< 0.5	< 20	< 50	< 100	< 100

10.2.2 Dust Inhalation & Soil Ingestion

Laboratory analytical results are presented in Appendix 7. Soil analytical results compared against combined dust inhalation and soil ingestion risk assessed through the application of NEPM ASC (2013) Health Investigation Levels (HILs) for exposure to soil contaminants are presented in Table 16. Hydrocarbon concentrations which exceeded laboratory LOR would be highlighted in bold, and HIL exceedances would be highlighted with a coloured cell indicating the highest HIL land used class which is exceeded. There were no exceedances for dust inhalation and soil ingestion at HIL guidelines at commercial/industrial land class, and no risk identified.

Table 16 Soil Analytical Results Compared Against NEPM ASC (2013) Health Investigation Levels Guidelines

CRC CARE Health Screening Level Assessment for PHC Inhalation Risk To Trench Workers From Soil Sample Analysis				EP080: BTEXN					EP080/071: TRH	
Bold - Indicates LOR Exceedances										
Dark Grey Shading - Indicates HSL Exceedances: >1 x, * 2-5 x, ** 5-20 x, * 20-50 x, **** >50 x**				Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	C6 - C10 Fraction	>C10 - C16 Fraction
Sample ID	Sample Date	Depth Class	Grain Class	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				LOR 0.2	LOR 0.5	LOR 0.5	LOR 0.5	LOR 1	LOR 10	LOR 50
BH1 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH2 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH3 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH4 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH8 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH5 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH6 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH7 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH9 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH10 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH11 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH12 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH13 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH14 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH15 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH16 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH17 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH18 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH19 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH20 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH21 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH22 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH23 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH24 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH25 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
Duplicate 1	16/08/2022									
Duplicate 2	16/08/2022									
INTER-LAB SPLIT 1	16/08/2022									
INTER-LAB SPLIT 2	16/08/2022									

11 INDOOR INHABITANT PVI ASSESSMENT – HSL's

This Petroleum Vapour Intrusion (PVI) assessment has been conducted in accordance with relevant CRC CARE Technical Documentation and NEPM 2013 guidelines presented in references section of this report. The HSL assessment approach is generally the first (Tier 1) investigation phase adopted for assessing PVI risk at petroleum hydrocarbon (PHC) impacted sites. HSL guidelines have been applied for samples collected from the site to account for risks that may be associated with volatile hydrocarbon vapour intrusion into confined spaces where there may be an inhalation risk through longer term exposure. This does not constitute a full vapour risk assessment but provides additional information from which to further quantify any risk.

A detailed investigation (Tier 2 to 3) is recommended over an HSL assessment where an acute risk has been identified at the site (CRC CARE 2013) because of:

- Migrating product on surface soils beneath buildings;
- Strong PHC odours;
- Flammable risk in confined spaces; and/or
- Health complaints from occupants.

Based on the site visits, none of the above conditions have been identified at the site. If the outcome of this Tier 1 assessment reveals HSL exceedances for hydrocarbon vapour intrusion, a more detailed (Tier 2) assessment will be required to further evaluate the human health risk.

PVI risk is initially interpreted through the development of HSL threshold limits from the following classifications:

- The geology and or hydrogeology of the investigation point; and
- Land use sensitivity:

The resulting HSL threshold limits are compared with laboratory analytical results.

11.1 Selected Media for Assessing PVI Risk

Table 17 presents a summary of the preferred HSL approach to assessing PVI risk. In this case, groundwater was not encountered and soil analysis was used to assess PVI risk.

Table 17 Preferred Methods for Determining Site PVI Risk

Media Analysed	Method	Limitations	Order of Preference
Soil Gas	Concentrations of a soil gas through a soil vapor sampler	This approach provides the most reliable data in interpreting PVI risk, although direct modelling should be applied if concentrations exceed HSL threshold limits.	Primary
Groundwater	Concentrations of PHC in groundwater through deployment of monitoring wells	More robust and reliable that soil in determining onsite and in particular, offsite risks. Determining PVI risk based on groundwater is inherently conservative when interpreting vapour risk to account for not readily discernible preferential pathways. Reference may be drawn to alternative assessment approaches: 1) Application of site-specific conditions to the CRC CARE model for assessing PVI risk 2) Soil gas interpretation for areas where a PVI risk is identified from groundwater analysis.	Secondary
Soil	Concentrations of PHC in soil	Concentrations in soil may be subject variability due to soil moisture, organic content and oxygen ingress all which create significant bias in threshold values. Reliance is place on utilizing groundwater analysis over soil. Soil results provide localised information.	Tertiary

11.2 Land Use Class

For surrounding properties, the potential PVI risk is characterized through application of CRC CARE HSL's for each individual property based on their existing land use (NEPM 2013; Friebel & Nadebaum 2010). The CRC CARE guidelines have been referenced to ensure that the correct land use and density category has been adopted for surrounding land use to ensure health risks are consistent with the HSL models. Aspects considered include the:

- Sensitivity of the existing or potential land use;
- Percentage of paved area for defining potential vapour migration risk;
- Type of basement garage which may influence the confinement of PHC vapors;
- Presence of a slab or cavity for discerning vapour intrusion risk.

If hydrocarbon impacted soil is discerned at the site, consideration is given to downgradient receptors. Where applicable, land use class therefore considers:

- Downgradient receptors where onsite HSL exceedances have been identified in soil; and
- Variations in land use for different parts of the proposed development.

The following land use classes are applied:

- *HSL D for Commercial / Industrial*

11.3 Soil Assessment Findings

Laboratory analytical results are presented in Appendix 7. Table 18 presents the results against a potential indoor vapour risk. Concentrations which exceeded laboratory LOR are highlighted in bold. HSL exceedances are highlighted with a coloured cell. There was no indoor vapour risk identified.

Table 18 Soil Analytical Results Compared Against HSL D for Indoor Vapour Risk

Soil Hydrocarbon HSL's for Assessing Indoor Vapour Intrusion (NEPM 2013) **Soil Sample Analysis**					EP080: BTEXN					EP080/071: TRH	
Bold - Indicates LOR Exceedances Colour Shading - Indicates HSL Exceedances: >1 x, * 2-5 x, ** 5-20 x, *** 20-50 x, **** >50 x					Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	F1	F2
Sample ID	Sample Date	Depth Class	Grain Class	HSL	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					LOR 0.2	LOR 0.5	LOR 0.5	LOR 0.5	LOR 1	LOR 10	LOR 50
BH1 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH2 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH3 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH4 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH8 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH5 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH6 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH7 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH9 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH10 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH11 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH12 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH13 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH14 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH15 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH16 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH17 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH18 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH19 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH20 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH21 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH22 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH23 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH24 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH25 0.10	16/08/2022	>SLAB/CUT RL	CLAY	D	<0.2	<0.5	<0.5	<0.5	<1	<10	<50

12 TRENCH WORKER PVI ASSESSMENT – HSL's

12.1 Classification

The following Health Screening Assessment is based on hydrocarbon vapour intrusion risk to subsurface excavation workers within excavations. This is assessed through analysis of vapours from soil and soil vapours. Groundwater is generally not used to assess risk as threshold limits for all depth and grain classes are non-limiting. Land use classes are not applicable when assessing vapour intrusion into trenches.

Soil and soil vapour HSL's for assessing hydrocarbon risk to maintenance workers are based on CRC CARE Technical Report 10 guidelines (Friebel & Nadebaum 2011) and the following variables:

- Dominant grain size class of material at the soil sample depth or based on the dominant grain class of the backfill material based on US Agriculture Soil Classification System (SCS) and partitioning into either sand, silt or clay; and
- Classifying soil according to depth ranges: 0 to 2 m; 2 to 4 m; 4 to 8 m; and greater than 8 m;

12.2 Findings

Laboratory analytical results are presented in Appendix 7. Summary of Soil Analytical Results Compared against HSL's for Assessing PVI Risk to Trench Workers are presented in Table 19. Concentrations that exceeded laboratory LOR would be highlighted in bold, and if there were any HSL exceedances they would be highlighted with a coloured cell. There were no exceedances of the CRC CARE HSL guidelines for Assessing PVI Risk to Trench Workers and no risk identified.

Table 19 Summary of Soil Analytical Results Compared against HSL's for Assessing PVI Risk to Trench Workers

CRC CARE Health Screening Level Assessment for PHC Inhalation Risk To Trench Workers From Soil Sample Analysis				EP080: BTEXN					EP080/071: TRH	
Bold - Indicates LOR Exceedances				Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	C6 - C10 Fraction	>C10 - C16 Fraction
Dark Grey Shading - Indicates HSL Exceedances: >1 x, * 2-5 x, ** 5-20 x, * 20-50 x, **** >50 x**										
Sample ID	Sample Date	Depth Class	Grain Class	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				LOR 0.2	LOR 0.5	LOR 0.5	LOR 0.5	LOR 1	LOR 10	LOR 50
BH1 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH2 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH3 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH4 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH8 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH5 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH6 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH7 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH9 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH10 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH11 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH12 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH13 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH14 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH15 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH16 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH17 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH18 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH19 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH20 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH21 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH22 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH23 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH24 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH25 0.10	16/08/2022	4 to 8m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50

13 SOIL DISPOSAL ASSESSSMENT

13.1 Guidelines

Soil which is excavated from the Site for landfill disposal is to be assessed against Information Bulletin 105 (IB105) for Classification and Management of Contaminated Soil for Disposal. The EPA uses four categories to classify contaminated soil as per Table 20:

- (Level 1) Fill Material;
- (Level 2) Low Level Contaminated Soil;
- (Level 3) Contaminated Soil; and
- (Level 4) Contaminated Soil for Remediation.

Fixed numerical values are presented for soil concentrations and leachable fraction concentrations.

Table 20 Summary of IB105 Classification Guidelines

	Classification (with reference to Table 2)	Controlled Waste[1]	Comments
Fill Material[2] (Level 1)	Soil that exhibits levels of contaminants below the limits defined under *Fill Material* in Table 2.	Unlikely	Soil classified as *Fill Material* can still be a 'pollutant' under the *Environmental Management and Pollution Control Act 1994* and needs to be responsibly managed.
Low Level Contaminated Soil (Level 2)	Soil that exhibits levels of contaminants above the limits defined under *Fill Material* but below the limits defined under *Low Level Contaminated Soil* in Table 2.	Likely	Where leachable concentrations have not been prescribed, maximum total concentrations will be used to classify the soil.
Contaminated Soil (Level 3)	Soil that exhibits levels of contaminants above the limits defined under *Low Level Contaminated Soil* but below the limits defined under *Contaminated Soil* in Table 2.	Yes	Where leachable concentrations have not been prescribed, maximum total concentrations will be used to classify the soil.
Contaminated Soil for Remediation (Level 4)	Soil that exhibits levels of contaminants above the limits defined under *Contaminated Soil* in Table 2 (regardless of the maximum total concentrations) is generally ***not*** considered acceptable for off-site disposal without prior treatment.	Yes	Soil that contains contaminants that do not have criteria for leachable concentrations (*e.g.* petroleum hydrocarbons), and the levels of contaminants exceed the maximum total concentrations listed in *Contaminated Soil*, are generally classified as *Contaminated Soil for Remediation*.

[1] Controlled Waste is defined in the *Environmental Management and Pollution Control Act 1994*.
[2] Criteria for *Fill Material* are the limits set by the Director for the purposes of R.9(2)(a)(ii) in the *Regulations*.

13.2 Findings

The soil samples have been compared against IB105 guidelines for potential future soil disposal, see Table 21. The following conclusions can be made:

- The majority of soil samples are considered IB105 Level 2 (Low Level Contaminated Soil), due to chromium and manganese

Information Bulletin 105 Classification and Management of Contaminated Soil For Disposal		Arsenic	Barium	Beryllium	Cadmium	Chromium Total	Copper	Cobalt	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Tin	Zinc	Aldrin + Dieldrin	DDT + DDD + DDE	Benzo(a)pyrene	Phenol	C6 - C9 Fraction	C10 - C36 Fraction (sum)	Sum of polycyclic aromatic hydrocarbons	Total Polychlorinated biphenyls	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total Cyanide	Fluoride
Unit		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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		50	1	2	5	5	2	5	5	5	0.1	2	2	5	2	5	5	0.05	0.05	0.5	0.5	10	50	0.5	0.1	0.2	0.5	0.5	0.5	1	40
Investigation Level Selected																															
IB105 Level 1		<20	<300	<2	<3	<50	<100	<100	<300	<500	<1	<10	<60	<10	<10	<50	<200	<2	<2	<0.08	<25	<65	<1000	<20	<2	<1	<1	<3	<14	<32	<300
IB105 Level 2		20	300	2	3	50	100	100	300	500	1	10	60	10	10	50	200	2	2	0.08	25	65	1000	20	2	1	1	3	14	32	300
IB105 Level 3		200	3000	40	40	500	2000	200	1200	5000	30	1000	600	50	180	500	14000	20	200	2	500	650	5000	40	20	5	100	100	180	1000	3000
IB105 Level 4		750	30000	400	400	5000	7500	1000	3000	25000	110	4000	3000	200	720	900	50000	50	1000	20	2000	1000	10000	200	50	50	1000	1080	1800	2500	10000
16/08/2022	BH1 0.10 X	<5	140	<1	<1	77	20	34	10	642	<0.1		41	<5			100			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH2 0.10 X	<5	150	<1	<1	80	20	41	6	892	<0.1		47	<5			61			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH3 0.10 X	<5	140	<1	<1	72	17	31	9	729	<0.1		34	<5			83			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH4 0.10 X	<5	180	<1	<1	77	17	36	6	873	<0.1		46	<5			68			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH8 0.10 X	<5	140	<1	<1	84	20	33	8	626	<0.1		48	<5			78			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH5 0.10 X	<5	140	<1	<1	72	18	29	11	672	<0.1		37	<5			82			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH6 0.10 X	<5	100	<1	<1	50	18	18	16	364	<0.1		28	<5			89			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH7 0.10 X	<5	120	<1	<1	52	36	25	13	554	<0.1		32	<5			72			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH9 0.10 X	<5	150	<1	<1	76	18	36	8	647	<0.1		40	<5			55			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH10 0.10 X	<5	130	<1	<1	52	30	19	11	358	<0.1		33	<5			80			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH11 0.10 X	<5	120	<1	<1	61	14	19	6	331	<0.1		37	<5			54			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH12 0.10 X	<5	120	<1	<1	82	24	25	6	444	<0.1		54	<5			70			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH13 0.10 X	<5	160	<1	<1	94	20	36	7	748	<0.1		52	<5			78			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH14 0.10 X	<5	100	<1	<1	78	28	25	6	388	<0.1		63	<5			75			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH15 0.10 X	<5	160	<1	<1	72	17	33	10	651	<0.1		38	<5			100			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH16 0.10 X	<5	160	<1	<1	109	24	27	6	501	<0.1		57	<5			84			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH17 0.10 X	<5	150	<1	<1	100	20	35	7	768	<0.1		51	<5			92			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH18 0.10 X	<5	140	<1	<1	92	20	33	7	681	<0.1		50	<5			93			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH19 0.10 X	<5	120	<1	<1	86	22	29	11	572	<0.1		51	<5			130			<0.5		<10	110	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH20 0.10 X	<5	130	<1	<1	86	16	34	<5	748	<0.1		41	<5			59			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH21 0.10 X	<5	120	<1	<1	80	19	32	6	663	<0.1		44	<5			68			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH22 0.10 X	<5	160	<1	<1	64	20	29	10	711	<0.1		38	<5			110			<0.5		<10	120	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH23 0.10 X	<5	140	<1	<1	75	17	35	8	819	<0.1		38	<5			80			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH24 0.10	<5	90	<1	<1	57	12	19	7	367	<0.1		30	<5			72			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	BH25 0.10	<5	160	<1	<1	74	16	34	8	548	<0.1		42	<5			64			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	Duplicate 1	<5	140	<1	<1	82	19	34	7	648	<0.1		48	<5			73			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	Duplicate 2	<5	140	<1	<1	94	20	34	7	705	<0.1		52	<5			90			<0.5		<10	<50	<0.5		<0.2	<0.5	<0.5	<0.5		
16/08/2022	INTER-LAB SPLIT 1	< 2	140	< 2	< 0.4	100	24	39	10	790	< 0.1		57				100			<0.5		< 20	< 50	<0.5		< 0.1	< 0.1	< 0.1	< 0.3		
16/08/2022	INTER-LAB SPLIT 2	< 2	170	< 2	0.5	120	30	33	14	630	< 0.1		60				130			<0.5		< 20	< 50	<0.5		< 0.1	< 0.1	< 0.1	< 0.3		

Table 21 Soil Analytical Results Compared Against IB105 Investigation Limits for soil Disposal

14 CONCEPTUAL SITE MODEL

14.1 Potential Contaminants

The site contains uncontrolled fill, and there is a low likelihood of past and current light industrial operations at the site, and/or neighbouring light industrial operations, having influence on the site. We have analysed for typical contaminants of soil in urban and light industrial areas including hydrocarbons and metals.

Figure 8 illustrates potential risks that may be associated with potential site contamination. Potential pathways have been identified and ruled out in the Conceptual Site Model.

14.2 Potential Human Receptors

Potential human receptors considered during this investigation include current and future commercial/industrial users of the site. Plus, any potential onsite constructions workers during the proposed and future potential site redevelopments, and future trench workers (commercial land users / trench worker specific).

14.3 Potential Ecological Receptors

The closest ecological receptors are a minor tributary feeding the Jordon River and the associated wetlands that run east/southeast of the Site. The closest of these features (minor tributary) is approximately 200m downgradient of the site.

14.4 Identified Receptors

14.4.1 Identified Human Receptors

Through comparing soil analytical results to HSL and HIL guidelines, and calculated vapour risks, no exceedances of guideline investigation limits were identified, and the soil on site does not pose a risk to human receptors.

14.4.2 Identified Ecological Receptors

Through comparing soil analytical results to EIL and ESL guidelines, no exceedances of guideline investigation limits were identified, and the soil on site does not pose a risk to ecological receptors.

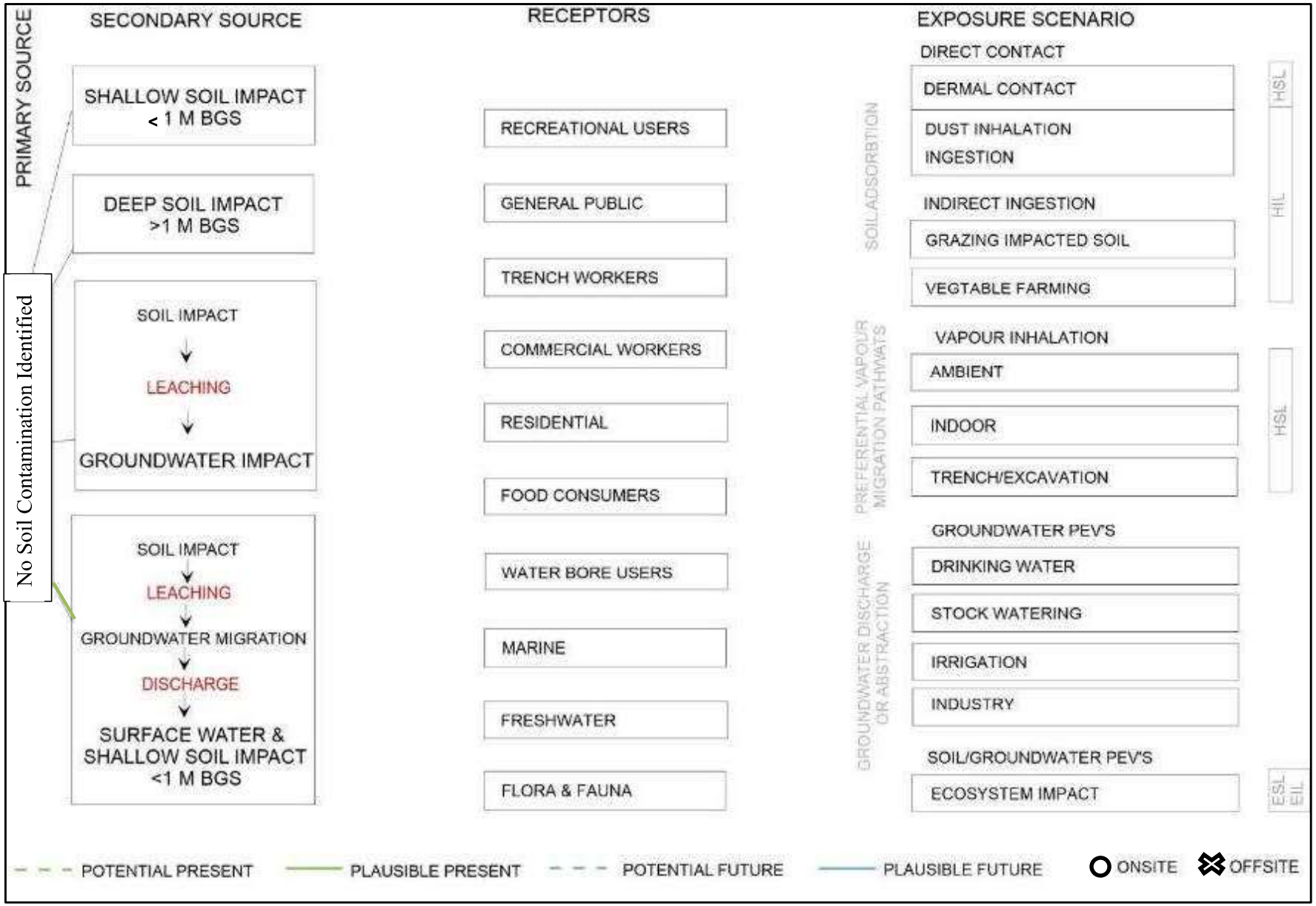


Figure 8 Conceptual Site Model

15 CONCLUSIONS & RECOMMENDIATIONS

15.1 Desktop Assessment

The following information was gathered during the desktop investigation:

- The Site is zoned *Light Industrial* under the *Tasmanian Planning Scheme*. The site an open area of pasture and is mostly flat in the investigation area. The soil surface in the investigation area consists of natural clay soils which are unlikely to feature significant introduced fill. Surface water is likely to enter the existing stormwater system on Taylor Crescent, and tend towards the Jordan River, which is the closest ecological receptor 350m to the east. Groundwater is likely to tend in a similar direction.
- The geology of the investigation area is mapped as Tertiary aged Basalt (Tb) with excavations noting a clay soil overlying weathered Basalt bedrock at shallow depths.
- Historical aerial photographs confirmed that the site has been predominantly used for grazing prior to the 1980s, since that time the site has remained vacant however some debris including small piles of fill suggests dumping of rubbish in the vicinity.
- Potential sources of contamination include; the presence of fill on the site, the movement of contaminants from adjacent and upgradient industrial operations to the site, the risk of contaminants from materials or vehicles intermittently stored on the site.
- Contaminants Of Potential Concern (COPC) include the following: TPH/TRH; Mono Aromatic hydrocarbons: (BTEXN); PAH; and 15 metals.

15.2 Adopted Guideline Settings

The following investigation limits were adopted for the Site:

- Ecosystem receptor
    - Intermittent unnamed tributary passing through the site, and Grasstree Hill Rivulet 500m downgradient of the site, commercial/industrial land use ESL and EILs for the site itself, and urban/residential land use ESL and EILs for nearby ecological receptors.
- Human Receptor
    - HIL D/ HIL D for soil direct contact risk to current and future site users (light industrial) / Construction workers that may have access to the soil during developments
    - HIL D / HIL D for soil ingestion and dust inhalation risk to current and future site users (light industrial) / Future construction workers soil direct contact risk
    - HSL D/ HSL D indoor vapour risk to current and future site users (commercial/industrial) / Future potential trench workers

15.3 Soil Assessment

From the soil assessment, it is concluded that:

- Environment: There were no EIL or ESL exceedances and therefore no risk to ecological receptors identified.
- Human Health: There were no human health guideline exceedances and therefore no risk to human receptors for dermal contact, dust inhalation and soil ingestion risk or vapour intrusion, at commercial/industrial land use guidelines.
- Excavated Soil Management: In terms of EPA Information Bulletin No.105 (IB105) of the six (6) primary soil samples, one (1) sample is considered Level 2 Material (Low Level Contaminated Soil) due to Benzo(a)pyrene, and the remaining five (5) samples are considered Level 1 Material (Clean Fill). The soil on site is safe for the intended use, and disposal of soil off site should be in accordance with *IB105*.

15.4 Conclusion Summary

- There were no exceedances of soil contamination guidelines in accordance with NEPM ASC (2013), and no risk to human health or ecological receptors identified.

GES recommends the following:

- Soil contamination has not been identified at the site through this investigation, and the site is considered safe for intended use at commercial/industrial guidelines, including soil excavation required for the construction of additions to an existing shed.
- Any disposal of soil from the site will need to be in accordance with IB105 and controlled waste guidelines as Level 2 Material.

Yours faithfully,

Mark Downie B.Agr.Sci

Soil Scientist

16 REFERENCES

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17 LIMITATIONS STATEMENT

This *Environmental Site Assessment* Report has been prepared in accordance with the scope of services between Geo-Environmental Solutions Pty. Ltd. (GES) and Young Group ('the Client'). To the best of GES's knowledge, the information presented herein represents the Client's requirements at the time of printing of the Report. However, the passage of time, manifestation of latent conditions or impacts of future events may result in findings differing from that described in this Report. In preparing this Report, GES has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations referenced herein. Except as otherwise stated in this Report, GES has not verified the accuracy or completeness of such data, surveys, analyses, designs, plans and other information.

The scope of this study does not allow for the review of every possible soil and groundwater contaminant over the whole area of the site. Samples collected from the investigation area are assumed to be representative of the areas from where they were collected and indicative of the contamination status of the site at that point in time. The conclusions described within this report are based on these samples, the results of their analysis and an assessment of their contamination status.

This report does not purport to provide legal advice. Readers of the report should engage professional legal practitioners for this purpose as required.

No responsibility is accepted for use of any part of this report in any other context or for any other purpose by third party.

18 Appendix 1 GES Staff

Geo-Environmental Solutions (GES) is a specialist geotechnical and environmental consultancy providing advice on all aspects of soils, geology, hydrology, and soil and groundwater contamination across a diverse range of industries.

Geo Environmental Solutions Pty Ltd:

- ACN – 115 004 834
- ABN – 24 115 004 834

GES STAFF - ENGAGED IN SITE INVESTIGATION WORKS

Dr John Paul Cumming B.Agr.Sc (Hons) Phd CPSS GAICD

- Principle Author and Principle Environmental Consultant
- PhD in Environmental Soil Chemistry from the University of Tasmania in 2007
- 18 years' experience in environmental contamination assessment and site remediation.

Mr Mark Downie B.Agr.Sc

- Soil Scientist – 15 years' experience
- 8 years' experience in contamination assessment and reporting of soils, groundwater and vapour.

GES STAFF – CONTAMINATED SITES EXPERIENCE

Dr Sam Rees B.Agr.Sc (Phd)

- Soil & Environmental Scientist
- 6 years' experience in hydrocarbon and heavy metal contamination assessment and reporting of soils and groundwater.

Mr Grant McDonald (Adv. cert. hort.)

- Soil Technician
- 10 years' experience in hydrocarbon and heavy metal contamination sampling of soils and groundwater.

Mr Aaron Plummer (Cert. IV)

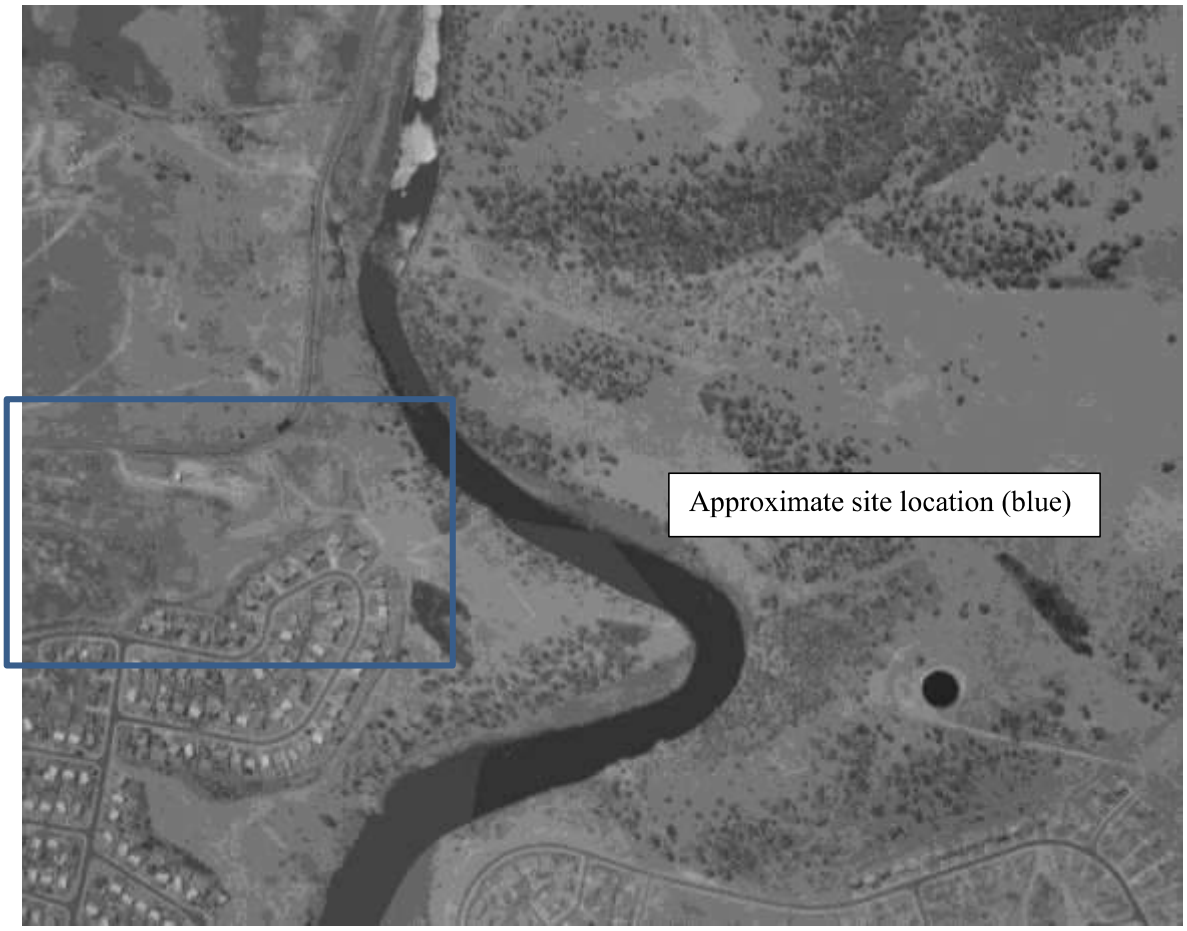
- Soil Technician
- 6 years' experience in hydrocarbon and heavy metal contamination sampling of soils and groundwater.

19 Appendix 2 Site Photographs

August 2022 Site Visit

20 Appendix 3 Historical Aerial Photographs and Images

February 1986 - Source DPIPWE



February 1987 - Source DPIPWE

February 1988 - Source DPIPWE

December 1988 - Source DPIPWE

December 1989 –Source DPIPWE

February 1992 –Source DPIPWE

March 2005 – Source Google Earth

September 2009 – Source Google Earth

November 2014 – Source Google Earth

March 2022 – Source Google Earth

21 Appendix 4 Bore Hole Logs

GES GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH1

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.6
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride		
0.1						<5 40 1 7 7 3 8 4 64 0.1 4 <5 100 <0.5 <1 <3 0.5 <2 5 5 5		
0.2								
0.3	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.		CH					
0.4								
0.5								
0.6								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1 2 Level 2; 3 Level 3; 4 Level 4 SAMPLE IN EXCAVATION ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH2

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.5
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC					
0.1								
0.2								
0.3	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm, refusal on weathered basalt.		CH					
0.4								
0.5								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 SAMPLE IN EXCAVATION ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA	Log of	BH3
CLIENT: Young Group	EASTING:	GDA94
	NORTHING:	GDA94
BORING LOCATION: Bridgewater	ELEVATION AND DATUM:	m AHD
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L	TOTAL DEPTH (m): 0.7	
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM	NATURAL (m):	WATER TABLE (m):
SAMPLING: Direct Push DATE: 16/08/2022		

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5401<72 3819720 13445 83 <0.5<1900.5<92855.5		
0.1 – 0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6 – 0.7	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

IB105 Analytes: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✕ APPROXIMATE GROUNDFLOOR LEVEL

GES GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		**Log of BH4**
CLIENT: Young Group		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.7
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5801<77 3066870.1465 68 <0.5<1<80.5<0285.5		
0.1 – 0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6 – 0.7	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

Tas EPA IB105 CLASSIFICATION: ☐ Level 1 [2] Level 2 [3] Level 3 [4] Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GES
GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA	Log of	BH5
CLIENT: Young Group	EASTING:	GDA94
	NORTHING:	GDA94
BORING LOCATION: Bridgewater	ELEVATION AND DATUM:	m AHD
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L	TOTAL DEPTH (m): 0.65	
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM	NATURAL (m):	WATER TABLE (m):
SAMPLING: Direct Push DATE: 16/08/2022		

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5401<72 29967̶0.137̶5 82 <0.5<180.5902855.5		
0.1 – 0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6 – 0.65	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

IB105 Analyte IL Exceedances columns: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✘ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA	Log of	BH6
CLIENT: Young Group	EASTING:	GDA94
	NORTHING:	GDA94
BORING LOCATION: Bridgewater	ELEVATION AND DATUM:	m AHD
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L	TOTAL DEPTH (m): 0.65	
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM	NATURAL (m):	WATER TABLE (m):
SAMPLING: Direct Push DATE: 16/08/2022		

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5001 50 18 8860 128 5 89 <0.5 130 0.5 9 28 5 5.5		
0.1 – 0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6 – 0.65	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✘ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH7

EASTING: **GDA94**
NORTHING: **GDA94**
ELEVATION AND DATUM: **m AHD**
TOTAL DEPTH (m): 0.65
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC					
0.1	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.		CH					
0.6	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.		GC					

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 SAMPLE IN EXCAVATION ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		Log of **BH8**
CLIENT: Young Group		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.4
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5401 84 33320 1485 78 <0.5 130.9 235.5		
0.1 – 0.4	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm, refusal on weathered basalt.	Tbs	CH					

IB105 analytes: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA	**Log of**	**BH9**
CLIENT: Young Group	EASTING:	**GDA94**
	NORTHING:	**GDA94**
BORING LOCATION: Bridgewater	ELEVATION AND DATUM:	**m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L	TOTAL DEPTH (m): 0.3	
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM	NATURAL (m):	WATER TABLE (m):
SAMPLING: Direct Push DATE: 16/08/2022		

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances (Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium vi, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride)	MONITORING WELL	ELEVATION (metres)
0.0								
0.1						<550k176 36C540.140<5 55 <0.5<1<0.5<0.2<0.5.5		
0.2	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm, refusal on weathered basalt.	Tbs	CH					

Tas EPA IB105 CLASSIFICATION: ☐ Level 1 [2] Level 2 [3] Level 3 [4] Level 4 | SAMPLE IN EXCAVATION | ✕ APPROXIMATE GROUNDFLOOR LEVEL

GES GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		**Log of BH10**
CLIENT: Young Group		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.4
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0–0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5301·52 19.9380.133·5 80 <0.5·1380.59·285.5		
0.1–0.4	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm, refusal on weathered basalt.	Tbs	CH					

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		**Log of BH11**
CLIENT: Young Group		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.7
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.		SC			<5201< 61 1996380.1375 54 <0.51300.59285.5		
0.1 – 0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6 – 0.7	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.		GC					

Tas EPA IB105 CLASSIFICATION: 1 Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH12

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.1
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	FILL - CLAY trace gravel: medium plasticity, dark grey-brown, moist, firm.	Tbs	CL			Arsenic <5, Barium 201, Beryllium <1, Cadmium 0.8, Chromium 22, Chromium VI <5, Copper 25, Cobalt 9, Lead 40, Manganese 154, Mercury <0.1, Molybdenum <5, Nickel 70, Selenium <5, Silver <0.5, Tin <5, Zinc 130, Aldrin+Dieldrin <0.3, DDT etc <0.8, Benzo(a)pyrene 0.5, Phenol <0.5, TPH C6 - C9 <25, TPH C10 - C36 <50, PAH Sum/TEQ 0.5, PCB's <0.1, Benzene <0.2, Toluene <0.5, Ethylbenzene <1, Total Xylenes <3, Cyanide <5, Fluoride 55		
0.1								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH13

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.1
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	FILL - CLAY trace gravel: medium plasticity, dark grey-brown, moist, firm.	Tbs	CL			Arsenic <5, Barium 60, Beryllium <1, Cadmium 94, Chromium 38, Chromium VI <0.4, Copper 67, Cobalt 40, Lead 152, Manganese <5, Mercury 78, Molybdenum <0.5, Nickel 1, Selenium 30, Silver 0.8, Tin 28, Zinc 55, Aldrin+Dieldrin <0.5, DDT etc <0.5, Benzo(a)pyrene <0.5, Phenol <0.5, TPH C6 - C9 <25, TPH C10 - C36 <50, PAH Sum/TEQ <0.5, PCB's <0.1, Benzene <0.2, Toluene <0.5, Ethylbenzene <0.5, Total Xylenes <1.5, Cyanide <0.5, Fluoride <0.5		
0.1								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH14

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.1
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	FILL - CLAY trace gravel: medium plasticity, dark grey-brown, moist, firm.	Tbs	CL			Arsenic <500, Barium 178, Beryllium 2, Cadmium 5, Chromium VI 60, Copper 163, Cobalt 5, Lead 75, Manganese <0.5, Mercury 1, Molybdenum 30, Nickel 8, Selenium 2, Silver 85, Tin 5, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride		
0.1								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 SAMPLE IN EXCAVATION ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT:	115 Cove Hill Road ESA
CLIENT:	Young Group
Log of	BH15
EASTING:	GDA94
NORTHING:	GDA94
BORING LOCATION:	Bridgewater
ELEVATION AND DATUM:	m AHD
DRILLING CONTRACTOR:	Geo-Environmental Solutions P/L
TOTAL DEPTH (m):	0.7
EQUIPMENT/METHOD:	Geoprobe 540UD
LOGGED BY:	GM
NATURAL (m):	
WATER TABLE (m):	
SAMPLING:	Direct Push
DATE:	16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0–0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5 601 <1 72 33 36 80 0.1 38 5 100 <0.5 <1 80 0.5 <0.5 0.5 0.5		
0.1–0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6–0.7	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

IB105 Analytes: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GES GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		Log of BH16
CLIENT: Young Group		
		EASTING: GDA94
		NORTHING: GDA94
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: m AHD
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.65
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5601<10927276880.1575 84 <0.5<130.5<0.28505.5		
0.1 – 0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6 – 0.65	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✗ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH17

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.3
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5 60 1 100 35 57 80 15 1 5 92 <0.5 1 30 5 8 25 5 5		
0.1	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm, refusal on weathered basalt.		CH					
0.2								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 SAMPLE IN EXCAVATION ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		**Log of BH18**
CLIENT: Young Group		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.4
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium vi, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0–0.2	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5401< 92 333580 150<5 93 <0.5<100.5<0285.5		
0.2–0.4	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm, refusal on weathered basalt.	Tbs	CH					

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GES
GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		**Log of BH19**
CLIENT: Young Group		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.4
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5201 86 29357 0.15 1<5 130 <0.5 130 0.5 5 0.2 8 5.5		
0.1 – 0.35	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.35 – 0.4	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		**Log of**	**BH20**
CLIENT: Young Group		EASTING:	**GDA94**
		NORTHING:	**GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM:	**m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.5	
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m):	WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022		

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0–0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5301k 86 3-84K140 141k5 59 <0.5 1k30.5 9285.5		
0.1–0.5	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm, refusal on weathered basalt.	Tbs	CH					

IB105 Analyte IL Exceedances columns: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; [2] Level 2; [3] Level 3; [4] Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GES GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH21

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.7
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC					
0.1	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.		CH					
0.6	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.		GC					
0.7								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 SAMPLE IN EXCAVATION ✖ APPROXIMATE GROUNDFLOOR LEVEL

GES
GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA		**Log of BH22**
CLIENT: Young Group		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.7
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium III, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0–0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			<5601 64 29297140.138 5 110 <0.5 130.5 9 285 5.5		
0.1–0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6–0.7	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✕ APPROXIMATE GROUNDFLOOR LEVEL

GES GEO-ENVIRONMENTAL SOLUTIONS

	PROJECT: 115 Cove Hill Road ESA CLIENT: Young Group	**Log of BH23**
		EASTING: **GDA94**
		NORTHING: **GDA94**
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: **m AHD**
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.7
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

IB105 Analyte IL Exceedances: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium vi, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0 – 0.1	Clayey SAND: dark grey-brown, moist, medium dense.		SC			<5401<75 35593410.1385 80 <0.5<1010.5930.255.5		
0.1 – 0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6 – 0.7	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.		GC					

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✖ APPROXIMATE GROUNDFLOOR LEVEL

GES GEO-ENVIRONMENTAL SOLUTIONS

PROJECT: 115 Cove Hill Road ESA
CLIENT: Young Group

Log of BH24

EASTING: GDA94
NORTHING: GDA94
ELEVATION AND DATUM: m AHD
TOTAL DEPTH (m): 0.7
NATURAL (m): WATER TABLE (m):

BORING LOCATION: Bridgewater
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L
EQUIPMENT/METHOD: Geoprobe 540UD LOGGED BY: GM
SAMPLING: Direct Push DATE: 16/08/2022

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC					
0.1	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.		CH					
0.6	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.		GC					
0.7								

Tas EPA IB105 CLASSIFICATION: ☐ Level 1; 2 Level 2; 3 Level 3; 4 Level 4 SAMPLE IN EXCAVATION ✖ APPROXIMATE GROUNDFLOOR LEVEL

GES GEO-ENVIRONMENTAL SOLUTIONS	PROJECT: 115 Cove Hill Road ESA CLIENT: Young Group	Log of BH25
		EASTING: GDA94
		NORTHING: GDA94
BORING LOCATION: Bridgewater		ELEVATION AND DATUM: m AHD
DRILLING CONTRACTOR: Geo-Environmental Solutions P/L		TOTAL DEPTH (m): 0.65
EQUIPMENT/METHOD: Geoprobe 540UD	LOGGED BY: GM	NATURAL (m): WATER TABLE (m):
SAMPLING: Direct Push	DATE: 16/08/2022	

DEPTH (metres)	MATERIAL DESCRIPTION	Geology	USCS Lithology	Laboratory Sample	Field PID (ppm)	IB105 Analyte IL Exceedances	MONITORING WELL	ELEVATION (metres)
0.0–0.1	Clayey SAND: dark grey-brown, moist, medium dense.	Tbs	SC			[illegible] 74 [illegible] 540 142 5 64 <0.5 [illegible] 5.5		
0.1–0.6	CLAY trace gravel: high to medium plasticity, dark grey-brown, moist, firm.	Tbs	CH					
0.6–0.65	Clayey GRAVEL: brown, slightly moist, very dense, refusal on weathered basalt.	Tbs	GC					

IB105 Analyte IL Exceedances columns: Arsenic, Barium, Beryllium, Cadmium, Chromium, Chromium VI, Copper, Cobalt, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc, Aldrin+Dieldrin, DDT etc, Benzo(a)pyrene, Phenol, TPH C6 - C9, TPH C10 - C36, PAH Sum/TEQ, PCB's, Benzene, Toluene, Ethylbenzene, Total Xylenes, Cyanide, Fluoride

Tas EPA IB105 CLASSIFICATION: Level 1; 2 Level 2; 3 Level 3; 4 Level 4 | SAMPLE IN EXCAVATION | ✘ APPROXIMATE GROUNDFLOOR LEVEL

22 Appendix 5 Chain of Custody (COC) and Sample Receipt Notification (SRN)

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2215963**		
Client	: **GEO-ENVIRONMENTAL SOLUTIONS**	Laboratory	: Environmental Division Melbourne
Contact	: DR JOHN PAUL CUMMING	Contact	: Katie Davis
Address	: 29 KIRKSWAY PLACE BATTERY POINT TASMANIA, AUSTRALIA 7004	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: jcumming@geosolutions.net.au	E-mail	: katie.davis@alsglobal.com
Telephone	: +61 03 6223 1839	Telephone	: +61-3-8549 9600
Facsimile	: +61 03 6223 4539	Facsimile	: +61-3-8549 9626
Project	: COVE	Page	: 1 of 4
Order number	: ----	Quote number	: EB2017GEOENVSOL0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: G MCDONALD		

Dates

Date Samples Received	: 19-Aug-2022 11:37	Issue Date	: 19-Aug-2022
Client Requested Due Date	: 26-Aug-2022	Scheduled Reporting Date	: **26-Aug-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 7.4°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 50 / 28

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 laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

RIGHT SOLUTIONS | RIGHT PARTNER

Issue Date	: 19-Aug-2022
Page	: 2 of 4
Work Order	: EM2215963 Amendment 0
Client	: GEO-ENVIRONMENTAL SOLUTIONS

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	Sampling date / time	Sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-07 TRH/BTEXN/PAH (SIM)
EM2215963-001	16-Aug-2022 00:00	BH1 0.10		✓	✓	✓
EM2215963-002	16-Aug-2022 00:00	BH2 0.10		✓	✓	✓
EM2215963-003	16-Aug-2022 00:00	BH3 0.10		✓	✓	✓
EM2215963-004	16-Aug-2022 00:00	BH4 0.10		✓	✓	✓
EM2215963-005	16-Aug-2022 00:00	BH5 0.10		✓	✓	✓
EM2215963-006	16-Aug-2022 00:00	BH6 0.10		✓	✓	✓
EM2215963-007	16-Aug-2022 00:00	BH7 0.10		✓	✓	✓
EM2215963-008	16-Aug-2022 00:00	BH8 0.10		✓	✓	✓
EM2215963-009	16-Aug-2022 00:00	BH9 0.10		✓	✓	✓
EM2215963-010	16-Aug-2022 00:00	BH10 0.10		✓	✓	✓
EM2215963-011	16-Aug-2022 00:00	BH11 0.10		✓	✓	✓
EM2215963-012	16-Aug-2022 00:00	BH12 0.10		✓	✓	✓
EM2215963-013	16-Aug-2022 00:00	BH13 0.10		✓	✓	✓
EM2215963-014	16-Aug-2022 00:00	BH14 0.10		✓	✓	✓
EM2215963-015	16-Aug-2022 00:00	BH15 0.10		✓	✓	✓
EM2215963-016	16-Aug-2022 00:00	BH16 0.10		✓	✓	✓
EM2215963-017	16-Aug-2022 00:00	BH17 0.10		✓	✓	✓
EM2215963-018	16-Aug-2022 00:00	BH18 0.10		✓	✓	✓
EM2215963-019	16-Aug-2022 00:00	BH19 0.10		✓	✓	✓
EM2215963-020	16-Aug-2022 00:00	BH20 0.10		✓	✓	✓
EM2215963-021	16-Aug-2022 00:00	BH21 0.10		✓	✓	✓
EM2215963-022	16-Aug-2022 00:00	BH22 0.10		✓	✓	✓
EM2215963-023	16-Aug-2022 00:00	BH23 0.10		✓	✓	✓
EM2215963-024	16-Aug-2022 00:00	BH24 0.10		✓	✓	✓
EM2215963-025	16-Aug-2022 00:00	BH25 0.10		✓	✓	✓
EM2215963-026	16-Aug-2022 00:00	Duplicate 1		✓	✓	✓
EM2215963-027	16-Aug-2022 00:00	Duplicate 2		✓	✓	✓
EM2215963-029	16-Aug-2022 00:00	BH01 0.50	✓			
EM2215963-030	16-Aug-2022 00:00	BH02 0.50	✓			
EM2215963-031	16-Aug-2022 00:00	BH03 0.50	✓			
EM2215963-032	16-Aug-2022 00:00	BH04 0.50	✓			
EM2215963-033	16-Aug-2022 00:00	BH05 0.50	✓			
EM2215963-034	16-Aug-2022 00:00	BH06 0.50	✓			
EM2215963-035	16-Aug-2022 00:00	BH07 0.50	✓			
EM2215963-036	16-Aug-2022 00:00	BH08 0.40	✓			

Issue Date	: 19-Aug-2022
Page	: 3 of 4
Work Order	: EM2215963 Amendment 0
Client	: GEO-ENVIRONMENTAL SOLUTIONS

			(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-07 TRH/BTEXN/PAH (SIM)
EM2215963-037	16-Aug-2022 00:00	BH09 0.30	✓			
EM2215963-038	16-Aug-2022 00:00	BH10 0.50	✓			
EM2215963-039	16-Aug-2022 00:00	BH11 0.50	✓			
EM2215963-040	16-Aug-2022 00:00	BH15 0.50	✓			
EM2215963-041	16-Aug-2022 00:00	BH16 0.50	✓			
EM2215963-042	16-Aug-2022 00:00	BH17 0.30	✓			
EM2215963-043	16-Aug-2022 00:00	BH18 0.40	✓			
EM2215963-044	16-Aug-2022 00:00	BH19 0.40	✓			
EM2215963-045	16-Aug-2022 00:00	BH20 0.50	✓			
EM2215963-046	16-Aug-2022 00:00	BH21 0.50	✓			
EM2215963-047	16-Aug-2022 00:00	BH22 0.50	✓			
EM2215963-048	16-Aug-2022 00:00	BH23 0.50	✓			
EM2215963-049	16-Aug-2022 00:00	BH24 0.50	✓			
EM2215963-050	16-Aug-2022 00:00	BH25 0.50	✓			

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - W-03T 15 Metals (Total) (NEPM)	WATER - W-07 TRH/BTEXN/PAH
EM2215963-028	16-Aug-2022 00:00	Rinsate	✓	✓

Proactive Holding Time Report

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

Issue Date	: 19-Aug-2022
Page	: 4 of 4
Work Order	: EM2215963 Amendment 0
Client	: GEO-ENVIRONMENTAL SOLUTIONS

Requested Deliverables

All Invoices		
- A4 - AU Tax Invoice (INV)	Email	accounts@geosolutions.net.au
JOHN PAUL CUMMING		
- *AU Certificate of Analysis - NATA (COA)	Email	jcumming@geosolutions.net.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	jcumming@geosolutions.net.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	jcumming@geosolutions.net.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	jcumming@geosolutions.net.au
- A4 - AU Tax Invoice (INV)	Email	jcumming@geosolutions.net.au
- Chain of Custody (CoC) (COC)	Email	jcumming@geosolutions.net.au
- EDI Format - ENMRG (ENMRG)	Email	jcumming@geosolutions.net.au
- EDI Format - ESDAT (ESDAT)	Email	jcumming@geosolutions.net.au
MARK DOWNIE		
- *AU Certificate of Analysis - NATA (COA)	Email	mdownie@geosolutions.net.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	mdownie@geosolutions.net.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	mdownie@geosolutions.net.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	mdownie@geosolutions.net.au
- A4 - AU Tax Invoice (INV)	Email	mdownie@geosolutions.net.au
- Chain of Custody (CoC) (COC)	Email	mdownie@geosolutions.net.au
- EDI Format - ENMRG (ENMRG)	Email	mdownie@geosolutions.net.au
- EDI Format - ESDAT (ESDAT)	Email	mdownie@geosolutions.net.au

CHAIN OF CUSTODY

FREIGHT

CLIENT: GEOENVIRONMENTAL SOLUTIONS
OFFICE: 28 Kirkaway Pl, Rattery Point TAS 7004
PROJECT: COVE
ORDER NUMBER:
PROJECT MANAGER: JP Cumming
SAMPLER: C McDonald
COC emailed to ALS? (YES / NO)
Email Reports to: jcumming@geosolutions.net.au; mdownie@geosolutions.net.au
Email Invoice to: jcumming@geosolutions.net.au; accounts@geosolutions.net.au; mdownie@geosolutions.net.au

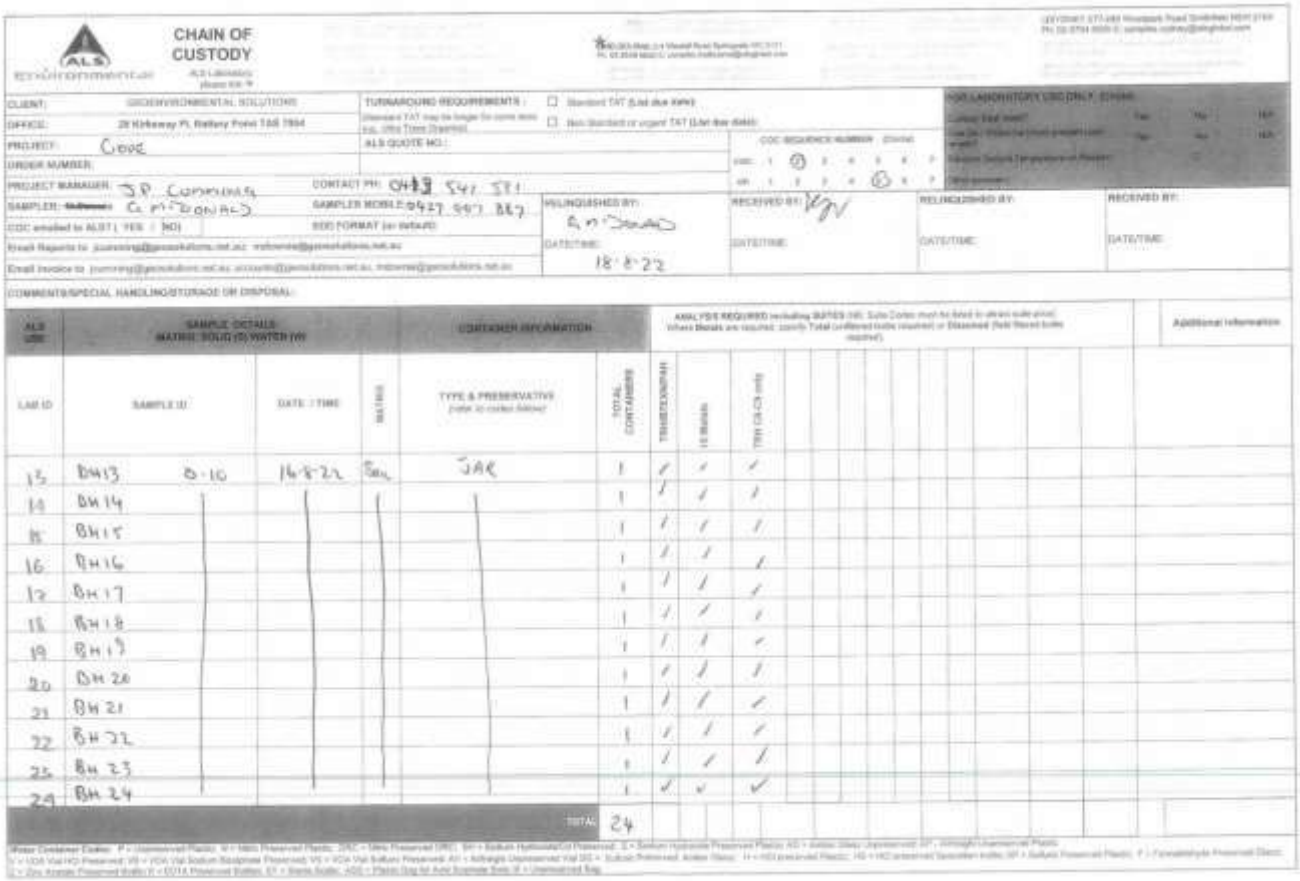
TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date); ☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
CONTACT PH: 0413 541 581
SAMPLER MOBILE: 0427 997 837
EDD FORMAT (or default):

RELINQUISHED BY: C McDonald — DATE/TIME: 18-1-22
RECEIVED BY: KSF — DATE/TIME: 19/8/22 11:37

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Environmental Division Melbourne
Work Order Reference
EM2215963

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL CONTAINERS	TRH/BTEX/NAPH	16 Metals	TRH CA-CS only
1	BH01 0-10	16-8-22	Soil	JAR	1	✓	✓	✓
2	BH02				1	✓	✓	✓
3	BH03				1	✓	✓	✓
4	BH04				1	✓	✓	✓
5	BH05				1	✓	✓	✓
6	BH06				1	✓	✓	✓
7	BH07				1	✓	✓	✓
8	BH08				1	✓	✓	✓
9	BH09				1	✓	✓	✓
10	BH10				1	✓	✓	✓
11	BH11				1	✓	✓	✓
12	BH12				1	✓	✓	✓
				TOTAL	12			



CHAIN OF CUSTODY

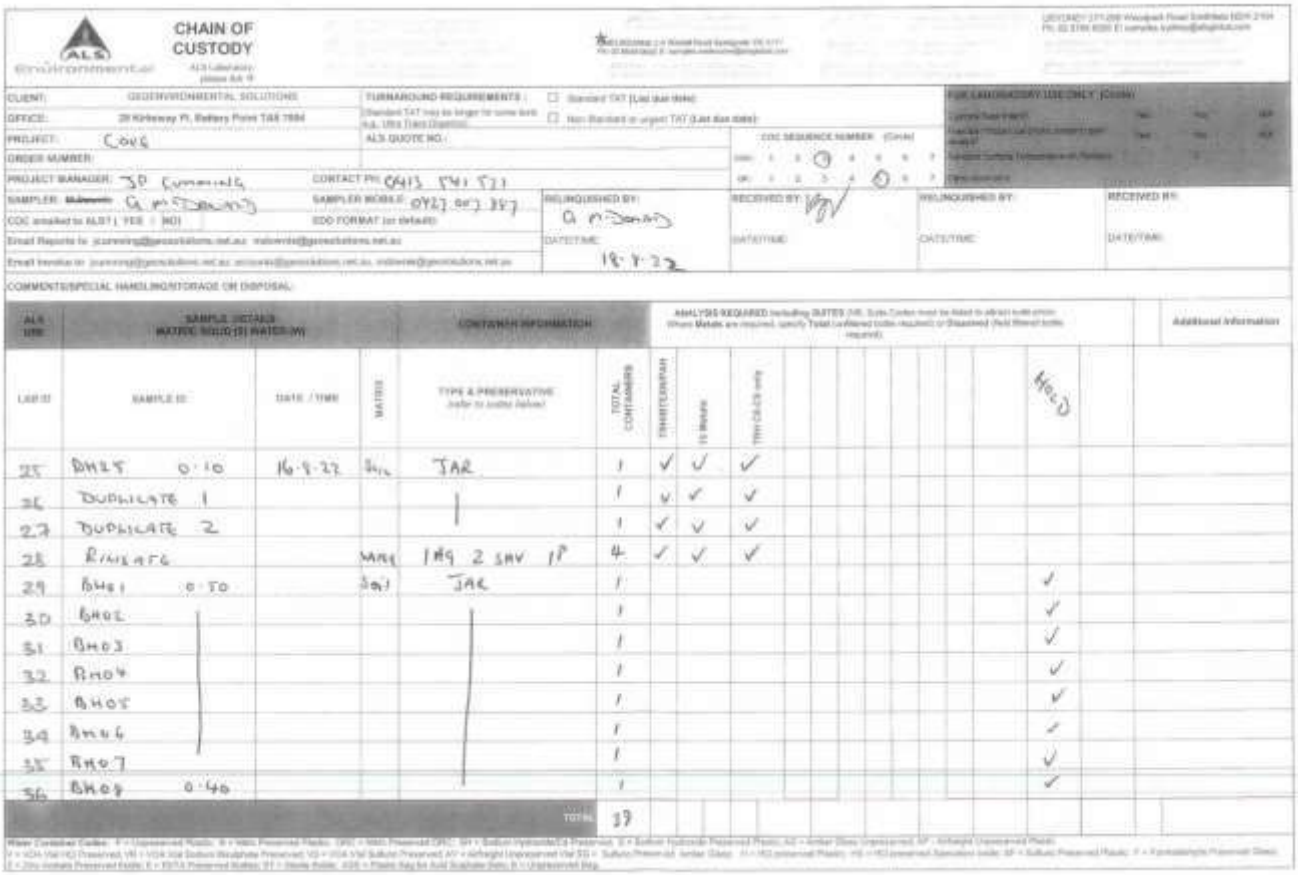
CLIENT: GEOENVIRONMENTAL SOLUTIONS
OFFICE: 28 Kirkaway Pl, Rattery Point TAS 7004
PROJECT: COVE
ORDER NUMBER:
PROJECT MANAGER: JP Cumming
SAMPLER: C McDonald
COC emailed to ALS? (YES / NO)
Email Reports to: jcumming@geosolutions.net.au; mdownie@geosolutions.net.au
Email Invoice to: jcumming@geosolutions.net.au; accounts@geosolutions.net.au; mdownie@geosolutions.net.au

TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date); ☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
CONTACT PH: 0413 541 581
SAMPLER MOBILE: 0427 997 837
EDD FORMAT (or default):

RELINQUISHED BY: C McDonald — DATE/TIME: 18-8-22
RECEIVED BY: — DATE/TIME:
RELINQUISHED BY: — DATE/TIME:
RECEIVED BY: — DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL CONTAINERS	TRH/BTEX/NAPH	16 Metals	TRH CA-CS only
13	BH13 0-10	16-8-22	Soil	JAR	1	✓	✓	✓
14	BH14				1	✓	✓	✓
15	BH15				1	✓	✓	✓
16	BH16				1	✓	✓	✓
17	BH17				1	✓	✓	✓
18	BH18				1	✓	✓	✓
19	BH19				1	✓	✓	✓
20	BH20				1	✓	✓	✓
21	BH21				1	✓	✓	✓
22	BH22				1	✓	✓	✓
23	BH23				1	✓	✓	✓
24	BH24				1	✓	✓	✓
				TOTAL	24			



CHAIN OF CUSTODY

CLIENT:	GEOENVIRONMENTAL SOLUTIONS	TURNAROUND REQUIREMENTS:	☐ Standard TAT (List due date):
OFFICE:	28 Kirkeway Pl, Battery Point TAS 7004		☐ Non Standard or urgent TAT (List due date):
PROJECT:	Cove	ALS QUOTE NO.:	
ORDER NUMBER:			
PROJECT MANAGER:	JD Cummins	CONTACT PH:	0413 541 521
SAMPLER:	G M Davis	SAMPLER MOBILE:	0427 007 327
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to: jcumming@geosolutions.net.au; mdavies@geosolutions.net.au			
Email Invoice to: jcumming@geosolutions.net.au; accounts@geosolutions.net.au; mdavies@geosolutions.net.au			

COC SEQUENCE NUMBER (Circle): UNK: 1 2 3 4 5 6 7; OR: 1 2 3 4 5 6 7

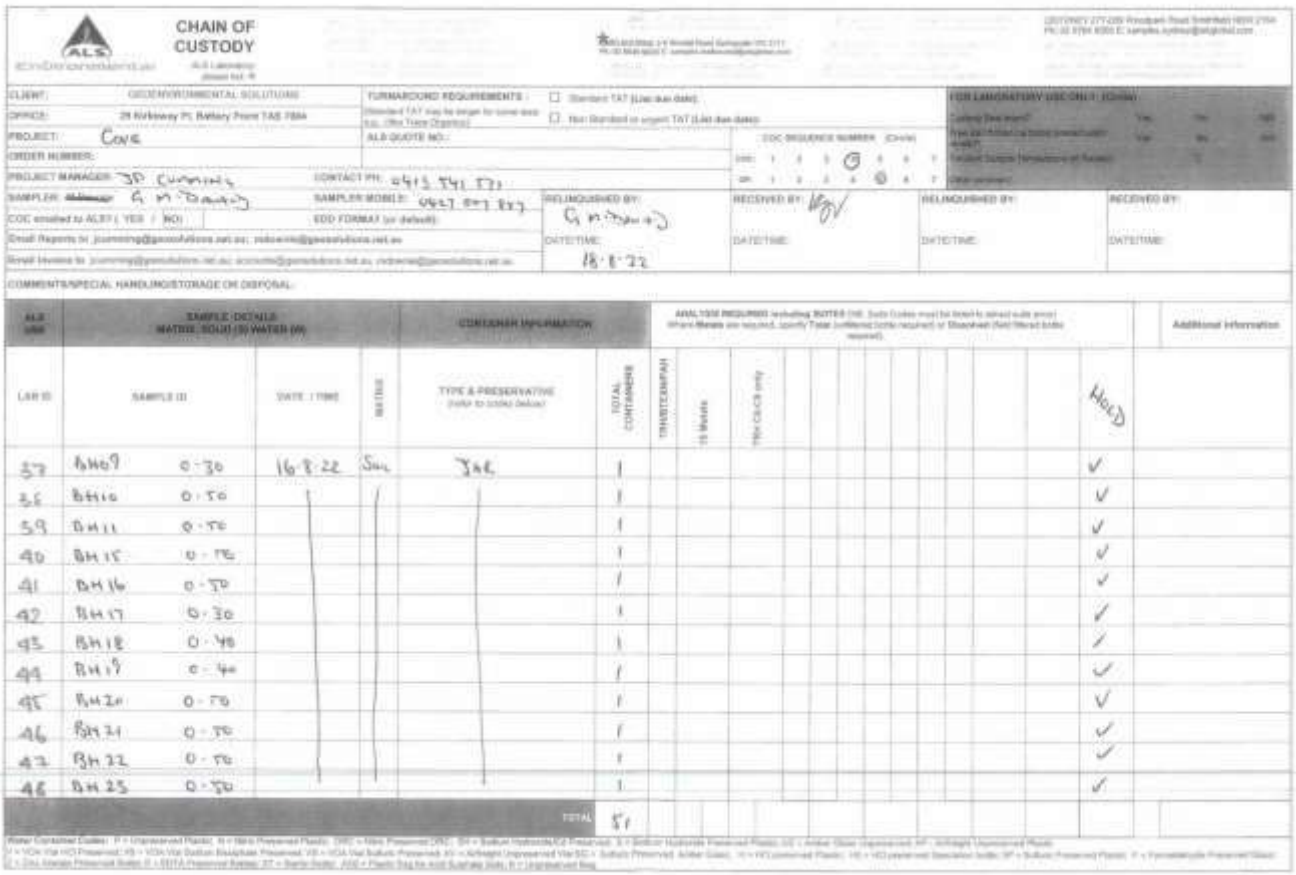
FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? Yes No N/A; Free ice / Chilled ice cubes present upon receipt? Yes No N/A; Temperature on Receipt: °C; Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
G M Davis			
DATE/TIME: 18.8.22	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS use	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).													Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	TRH/BTEX/PAH	15 Metals	TRH C6-C9 only									Hold		
25	BH25 0·10	16·8·22	Soil	JAR	1	✓	✓	✓											
26	DUPLICATE 1			|	1	✓	✓	✓											
27	DUPLICATE 2			|	1	✓	✓	✓											
28	RINSATE		Water	1HP 2 SAV 1P	4	✓	✓	✓											
29	BH01 0·50		Soil	JAR	1												✓		
30	BH02 |		|	|	1												✓		
31	BH03				1												✓		
32	BH04				1												✓		
33	BH05				1												✓		
34	BH06				1												✓		
35	BH07				1												✓		
36	BH08 0·40				1												✓		
				TOTAL	39														

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VS = VOA Vial Sodium Bisulphate Preserved; VA = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; AS = HCl preserved Plastic; VB = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; E = Zinc Acetate Preserved Bottle; ST = EDTA Preserved Bottle; B = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



CHAIN OF CUSTODY

CLIENT:	GEOENVIRONMENTAL SOLUTIONS	TURNAROUND REQUIREMENTS:	☐ Standard TAT (List due date):
OFFICE:	28 Kirkeway Pl, Battery Point TAS 7004		☐ Non Standard or urgent TAT (List due date):
PROJECT:	Cove	ALS QUOTE NO.:	
ORDER NUMBER:			
PROJECT MANAGER:	JD Cummins	CONTACT PH:	0413 541 521
SAMPLER:	G M Davis	SAMPLER MOBILE:	0427 007 327
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to: jcumming@geosolutions.net.au; mdavies@geosolutions.net.au			
Email Invoice to: jcumming@geosolutions.net.au; accounts@geosolutions.net.au; mdavies@geosolutions.net.au			

COC SEQUENCE NUMBER (Circle): UNK: 1 2 3 4 5 6 7; OR: 1 2 3 4 5 6 7

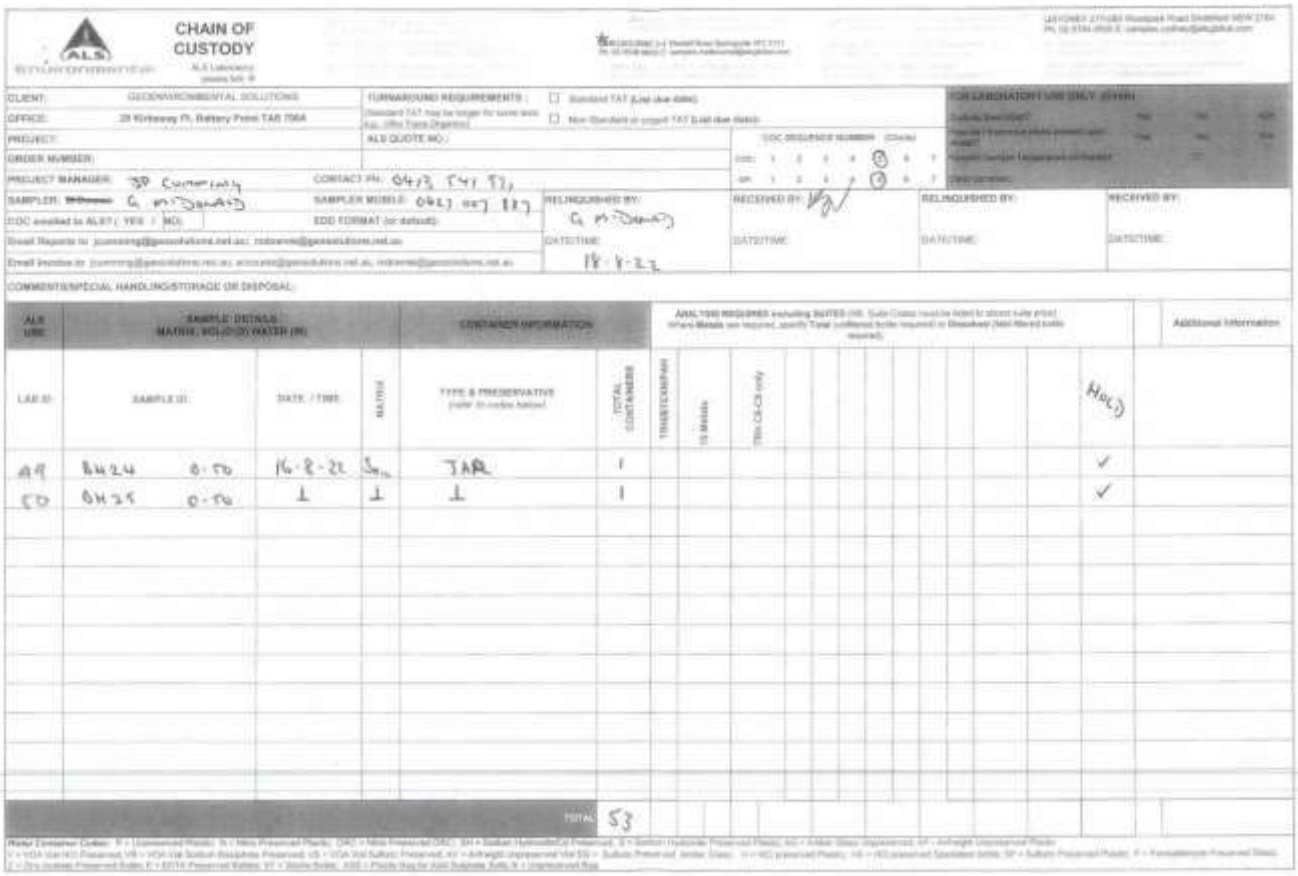
FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? Yes No N/A; Free ice / Chilled ice cubes present upon receipt? Yes No N/A; Temperature on Receipt: °C; Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
G M Davis			
DATE/TIME: 18.8.22	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS use	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).													Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	TRH/BTEX/PAH	15 Metals	TRH C6-C9 only									Hold		
37	BH09 0·30	16·8·22	Soil	JAR	1												✓		
38	BH10 0·50		|	|	1												✓		
39	BH11 0·50				1												✓		
40	BH15 0·50				1												✓		
41	BH16 0·50				1												✓		
42	BH17 0·30				1												✓		
43	BH18 0·40				1												✓		
44	BH19 0·40				1												✓		
45	BH20 0·50				1												✓		
46	BH21 0·50				1												✓		
47	BH22 0·50				1												✓		
48	BH25 0·50				1												✓		
				TOTAL	51														

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VS = VOA Vial Sodium Bisulphate Preserved; VA = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; AS = HCl preserved Plastic; VB = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; E = Zinc Acetate Preserved Bottle; ST = EDTA Preserved Bottle; B = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



CHAIN OF CUSTODY

ALS Laboratory

CLIENT: GEOENVIRONMENTAL SOLUTIONS

OFFICE: 28 Kirkaway Pl, Battery Point TAS 7004

PROJECT:

ORDER NUMBER:

PROJECT MANAGER: JD Cumming

SAMPLER: G. McDonald

CONTACT PH: 0413 541 513

SAMPLER MOBILE: 0421 007 127

COC emailed to ALS? (YES / NO)

EDD FORMAT (or default):

Email Reports to: jcumming@geosolutions.net.au; rodevere@geosolutions.net.au

Email Invoice to: jcumming@geosolutions.net.au; accounts@geosolutions.net.au; rodevere@geosolutions.net.au

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date);

Standard TAT may be longer for some tests (e.g. Ultra Trace Organics) ☐ Non-Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle): 1 2 3 4 5 6 7 8

RELINQUISHED BY: G McDonald — DATE/TIME: 18-8-22

RECEIVED BY: — DATE/TIME:

RELINQUISHED BY: — DATE/TIME:

RECEIVED BY: — DATE/TIME:

FOR LABORATORY USE ONLY (Circle)

ALS LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	TRH/BTEX/PAH	15 Metals	TRH C6-C9 +HV	Hold
A9	BH24 0-50	16-8-22	Soil	JAR	1				✓
50	BH25 0-50	1	1	1	1				✓
				TOTAL	53				

Additional Information

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VS = VOA Vial Sodium Bisulphate Preserved; ASS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; E = Ice Bottle Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

23 Appendix 6 Quality Assurance and Quality Control

Duplicate Comparison	Sample	Arsenic	Barium	Beryllium	Cadmium	Chromium Total	Cobalt	Copper	Lead	Manganese	Nickel	Zinc	Mercury
Unit		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		5	1	1	1	1	1	1	5	5	2	5	0.1
1/12/2021	Duplicate	<5	30	<1	<1	9	7	40	8	155	15	55	<0.1
1/12/2021	Pit 1 0.5m	<5	20	<1	<1	11	8	35	9	134	15	48	<0.1
Relative Percentage Difference (RPD) %		NA	40.0	NA	NA	20.0	13.4	13.3	11.8	14.5	0.0	27.9	NA
RPD Compliance Limit %		NA	30	NA	NA	50	NA	50	NA	30	50	50	NA
Method Detection Limit (MDL)		NA	100	NA	NA	100	NA	40	NA	300	40	100	NA
MDL Class		NONE	MED	NONE	NONE	LOW	NONE	LOW	NONE	MED	LOW	LOW	NONE
RPD Compliance With MDL?	55/56 (98%)	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Duplicate Comparison	Sample	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)
Unit		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
LOR		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1/12/2021	Duplicate	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5
1/12/2021	Pit 1 0.5m	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.8	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	2	0.5
Relative Percentage Difference (RPD) %		NA	NA	NA	NA	NA	NA	15.4	13.3	NA	NA	NA	NA	NA	NA	NA	NA	42.4	NA
RPD Compliance Limit %		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50	NA
Method Detection Limit (MDL)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10	NA
MDL Class		NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	LOW	NONE
RPD Compliance With MDL?	55/56 (98%)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Duplicate Comparison	Sample	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Sum of BTEX	Total Xylenes	Naphthalene	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	F1	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	F2	Benzo(a)pyrene TEQ (half LOR)	Benzo(a)pyrene TEQ (LOR)
Unit		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
LOR		0.2	0.5	0.5	0.5	0.5	0.2	0.5	1	10	50	100	100	50	10	10	50	100	100	50	50	0.6	0.5
1/12/2021	Duplicate	<0.2	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<1	<10	<50	110	270	380	<10	<10	<50	270	330	600	<50	0.6	1.2
1/12/2021	Pit 1 0.5m	<0.2	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<1	<10	<50	130	330	460	<10	<10	<50	300	480	750	<50	0.8	1.2
Relative Percentage Difference (RPD) %		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.7	20.0	19.0	NA	NA	NA	10.0	30.3	22.2	NA	28.6	0.0
RPD Compliance Limit %		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50	50	NA	NA	NA	30	30	50	NA	NA	50
Method Detection Limit (MDL)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2000	1000	NA	NA	NA	2000	2000	1000	NA	NA	10
MDL Class		NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	LOW	LOW	NONE	NONE	NONE	LOW	LOW	LOW	NONE	NONE	LOW
RPD Compliance With MDL?	55/56 (98%)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

***Footnote: For Duplicate and Pit 1 0.5m pairs, 98% of analytes complied. Non compliances include: an RPD of 40% for Barium where <30% was expected.**

Quality Control Blanks		Arsenic	Beryllium	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Boron	Mercury	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Naphthalene
Unit		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/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
LOR		0.001	0.001	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.01	0.005	0.05	0.0001	1	2	2	2	2	2	1	5
Date	Sample																							
1/12/2021	Rinsate	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.005	<0.05	<0.0001	<1	<2	<2	<2	<2	<2	<1	<5

Quality Control Blanks		C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene (F2)
Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		20	50	100	50	50	20	20	100	100	100	100	100
Date	Sample												
1/12/2021	Rinsate	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100

Quality Control Blanks		Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)
Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		1	1	1	1	1	1	1	1	1	1	1	1	0.5	1	1	1	0.5	0.5
Date	Sample																		
1/12/2021	Rinsate	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5

***Footnote: There were no detections above LOR in the Rinsate Blank sample.**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	EM2124453	Page	1 of 13
Client	GEO-ENVIRONMENTAL SOLUTIONS	Laboratory	Environmental Division Melbourne
Contact	DR JOHN PAUL CUMMING	Contact	Peter Ravlic
Address	29 KIRKSWAY PLACE BATTERY POINT TASMANIA, AUSTRALIA 7004	Address	4 Westall Rd Springvale VIC Australia 3171
Telephone	+61 03 6223 1839	Telephone	+61385499645
Project	Scotts Rd	Date Samples Received	03-Dec-2021
Order number	----	Date Analysis Commenced	07-Dec-2021
C-O-C number	----	Issue Date	10-Dec-2021
Sampler	JOHN PAUL CUMMING		
Site	----		
Quote number	EN/222		
No. of samples received	8		
No. of samples analysed	8		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

RIGHT SOLUTIONS | RIGHT PARTNER

ALS

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting. Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4069317)									
EM2124411-051	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	80	120	35.5	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	34	32	5.5	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	18	17	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	69	67	4.0	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	6	16.2	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	58	52	7.7	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	120	103	14.9	0% - 20%
		EG005T: Manganese	7439-96-5	5	mg/kg	372	368	1.6	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	24	27	11.4	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	216	194	11.0	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EM2124432-022	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	40	40	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	51	48	9.9	0% - 20%
		EG005T: Cobalt	7440-48-4	2	mg/kg	24	19	25.5	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	30	26	12.6	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	12	11	9.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	8	9	20.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	370	349	5.7	0% - 20%

Page : 3 of 13
Work Order : EM2124453
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Sub-Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4060317) - continued									
EM2124432-022	Anonymous	EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	57	54	5.3	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	11	11	0.0	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4062044)									
EM2124430-002	Anonymous	EA055: Moisture Content	---	0.1	%	5.5	5.5	0.0	No Limit
EM2124453-007	Duplicate	EA055: Moisture Content	---	0.1	%	12.2	9.1	28.2	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4060316)									
EM2124411-051	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.1	0.0	No Limit
EM2124432-022	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4060081)									
EM2124374-057	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM2124374-060	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

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Work Order : EM2124453
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Sub-Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4060081) - continued									
EM2124374-060	Anonymous	EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4059191)									
EM2124411-001	Anonymous	EP080: C6 - C9 Fraction	---	10	mg/kg	<10	<10	0.0	No Limit
EM2124411-036	Anonymous	EP080: C6 - C9 Fraction	---	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4059453)									
EM2124077-001	Anonymous	EP080: C6 - C9 Fraction	---	10	mg/kg	<10	<10	0.0	No Limit
EM2124077-011	Anonymous	EP080: C6 - C9 Fraction	---	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4060082)									
EM2124374-057	Anonymous	EP071: C15 - C28 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	---	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	---	50	mg/kg	<50	<50	0.0	No Limit
EM2124374-060	Anonymous	EP071: C15 - C28 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	---	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	---	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4059191)									
EM2124411-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EM2124411-036	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4059453)									
EM2124077-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EM2124077-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4060082)									
EM2124374-057	Anonymous	EP071: >C16 - C34 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	---	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	---	50	mg/kg	<50	<50	0.0	No Limit
EM2124374-060	Anonymous	EP071: >C16 - C34 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	---	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	---	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 4059191)									
EM2124411-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

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Work Order : EM2124453
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Sub-Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080: BTEXN (QC Lot: 4059191) - continued									
EM2124411-001	Anonymous	EP080: meta- & para-Xylene	108-38-3 / 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EM2124411-036	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 / 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP080: BTEXN (QC Lot: 4059455)									
EM2124077-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 / 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EM2124077-011	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 / 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Sub-Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020T: Total Metals by ICP-MS (QC Lot: 4059085)									
EM2124392-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.012	0.012	0.0	0% - 50%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.014	0.014	0.0	0% - 50%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.007	0.008	0.0	No Limit

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Project : Scotts Rd

Sub-Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020T: Total Metals by ICP-MS (QC Lot: 4059085) - continued									
EM2124392-001	Anonymous	EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EM2124428-012	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.039	0.039	0.0	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.009	0.009	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.053	0.060	4.4	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.070	0.070	0.0	0% - 50%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4060435)									
EM2124411-053	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2143092-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP060/071: Total Petroleum Hydrocarbons (QC Lot: 4060481)									
EM2124209-025	Anonymous	EP080: C6 - C9 Fraction	---	20	µg/L	50	50	0.0	No Limit
EM2124209-026	Anonymous	EP080: C6 - C9 Fraction	---	20	µg/L	90	140	41.1	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4060481)									
EM2124209-025	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	40	40	0.0	No Limit
EM2124209-026	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	110	150	30.9	No Limit
EP080: BTEXN (QC Lot: 4060481)									
EM2124209-025	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 / 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EM2124209-026	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 / 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit

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Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080: BTEXN (QC Lot: 4050401) - continued									
EM2124209-026	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4080317)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	97.5	70.0	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	92.4	70.0	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.67 mg/kg	93.5	70.0	130
EG005T: Boron	7440-42-8	50	mg/kg	<50	---	---	---	---
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	88.0	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	104	70.0	130
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	89.2	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	93.9	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	82.4 mg/kg	96.1	70.0	130
EG005T: Manganese	7439-96-5	5	mg/kg	<5	990 mg/kg	92.1	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	99.2	70.0	130
EG005T: Selenium	7782-49-2	5	mg/kg	<5	---	---	---	---
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	89.6	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	182 mg/kg	79.3	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4068315)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	95.3	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4060051)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	99.2	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	95.5	81.0	122
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	108	83.6	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	106	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	102	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	101	81.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	103	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	103	79.9	126
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	104	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	110	80.9	130
EP075(SIM): Benzo[b+j]fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	99.8	72.0	121
EP075(SIM): Benzo[k]fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	104	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	98.8	70.2	123
EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	99.4	67.9	122
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	99.1	65.8	123
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	103	65.8	127

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Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Acceptable Limits (%): Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4059191)								
EP080: C6 - C9 Fraction	---	10	mg/kg	<10	36 mg/kg	80.8	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4059455)								
EP080: C6 - C9 Fraction	---	10	mg/kg	<10	36 mg/kg	92.9	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4060082)								
EP071: C10 - C14 Fraction	---	50	mg/kg	<50	760 mg/kg	96.1	75.0	128
EP071: C15 - C28 Fraction	---	100	mg/kg	<100	3270 mg/kg	96.0	82.0	123
EP071: C29 - C36 Fraction	---	100	mg/kg	<100	1550 mg/kg	95.2	82.4	121
EP071: C10 - C36 Fraction (sum)	---	50	mg/kg	<50	5560 mg/kg	95.9	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4059191)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	80.6	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4059455)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	87.2	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4060082)								
EP071: >C10 - C16 Fraction	---	50	mg/kg	<50	1110 mg/kg	99.4	77.0	130
EP071: >C16 - C34 Fraction	---	100	mg/kg	<100	4180 mg/kg	93.1	81.5	120
EP071: >C34 - C40 Fraction	---	100	mg/kg	<100	290 mg/kg	103	73.3	137
EP071: >C10 - C40 Fraction (sum)	---	50	mg/kg	<50	5580 mg/kg	94.8	70.0	130
EP080: BTEXN (QCLot: 4059191)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	92.8	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	100	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	94.3	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	100	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	101	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	100	61.8	123
EP080: BTEXN (QCLot: 4059455)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	89.4	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	106	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	96.1	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	102	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	103	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	102	61.8	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Acceptable Limits (%): Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4059085)								

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Project : Scotts Rd

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Acceptable Limits (%): Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4059085) - continued								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.4	89.2	115
EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	91.4	86.0	115
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	94.6	87.2	117
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.2	86.4	115
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.0	86.9	113
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	93.8	87.7	113
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.9	88.9	111
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.8	88.3	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.6	88.7	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.8	87.9	113
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	93.0	84.8	116
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	91.3	87.1	114
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.8	86.7	117
EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	103	89.3	119
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4062435)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	101	73.4	119
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4057343)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	88.7	42.8	114
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	92.4	48.6	119
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	90.9	47.0	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	92.6	49.5	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	92.1	49.4	121
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	91.9	48.4	123
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	93.7	50.3	124
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	96.2	50.0	126
EP075(SIM): Benzo(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	95.7	49.4	127
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	93.0	48.7	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	95.9	54.5	134
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	94.3	56.1	134
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	95.4	53.6	135
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	96.0	54.4	126
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	95.2	54.5	126
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	95.8	54.4	126
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4057344)								
EP071: C10 - C14 Fraction	---	50	µg/L	<50	4670 µg/L	82.9	47.2	122
EP071: C15 - C28 Fraction	---	100	µg/L	<100	15800 µg/L	91.8	52.9	131
EP071: C29 - C36 Fraction	---	50	µg/L	<50	8180 µg/L	89.5	50.4	127

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Work Order : EM2124453
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS Recovery (%): LCS	Acceptable Limits (%): Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4057344) - continued								
EP071: C10 - C36 Fraction (sum)	---	50	µg/L	<50	28950 µg/L	89.7	51.5	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4060401)								
EP080: C6 - C9 Fraction	---	20	µg/L	<20	360 µg/L	97.3	68.2	134
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4057344)								
EP071: >C10 - C16 Fraction	---	100	µg/L	<100	6100 µg/L	85.6	48.1	125
EP071: >C16 - C34 Fraction	---	100	µg/L	<100	21200 µg/L	89.5	51.6	128
EP071: >C34 - C40 Fraction	---	100	µg/L	<100	1820 µg/L	86.0	47.2	130
EP071: >C10 - C40 Fraction (sum)	---	100	µg/L	<100	28920 µg/L	88.6	51.2	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4060401)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	102	68.2	132
EP080: BTEXN (QCLot: 4060401)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	104	68.8	127
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	104	72.9	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	104	71.7	130
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	102	72.3	136
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	103	75.9	134
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	110	68.3	131

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Acceptable Limits (%): Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4060317)							
EM2124432-002	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	98.4	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	95.5	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	92.8	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	106	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	94.8	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	116	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	94.9	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4060318)							
EM2124432-002	Anonymous	EG035T: Mercury	7439-97-6	0.5 mg/kg	103	76.0	116
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4060881)							

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Client : GEO-ENVIRONMENTAL SOLUTIONS
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Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Acceptable Limits (%): Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4060881) - continued							
EM2124374-059	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	92.5	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	87.9	65.5	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4059191)							
EM2124411-003	Anonymous	EP080: C6 - C9 Fraction	---	28 mg/kg	48.8	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4059455)							
EM2124077-002	Anonymous	EP080: C6 - C9 Fraction	---	28 mg/kg	102	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4060362)							
EM2124374-059	Anonymous	EP071: C10 - C14 Fraction	---	760 mg/kg	96.7	71.2	125
		EP071: C15 - C28 Fraction	---	3270 mg/kg	96.8	75.9	122
		EP071: C29 - C36 Fraction	---	1550 mg/kg	96.0	76.0	120
		EP071: C10 - C36 Fraction (sum)	---	5580 mg/kg	96.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4059191)							
EM2124411-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	32.4	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4059455)							
EM2124077-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	94.4	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4060362)							
EM2124374-059	Anonymous	EP071: >C10 - C16 Fraction	---	1110 mg/kg	100	72.2	126
		EP071: >C16 - C34 Fraction	---	4180 mg/kg	93.9	76.5	119
		EP071: >C34 - C40 Fraction	---	290 mg/kg	104	66.8	136
		EP071: >C10 - C40 Fraction (sum)	---	5580 mg/kg	96.7	70.0	130
EP080: BTEXN (QCLot: 4059191)							
EM2124411-003	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	97.5	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	104	57.1	131
EP080: BTEXN (QCLot: 4059455)							
EM2124077-002	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	112	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	127	57.1	131

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Acceptable Limits (%): Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4059895)							
EM2124302-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	89.6	82.0	123
		EG020A-T: Beryllium	7440-41-7	1 mg/L	93.6	79.0	126
		EG020A-T: Barium	7440-39-3	1 mg/L	89.9	80.0	120
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	92.9	81.8	123
		EG020A-T: Chromium	7440-47-3	1 mg/L	90.6	78.6	119
		EG020A-T: Cobalt	7440-48-4	1 mg/L	91.2	80.7	121

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Client	GEO-ENVIRONMENTAL SOLUTIONS
Project	Scotts Rd

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4059805) - continued							
EM2124392-001	Anonymous	EG020A-T: Copper	7440-50-8	1 mg/L	90.0	80.4	118
		EG020A-T: Lead	7439-92-1	1 mg/L	85.5	80.5	121
		EG020A-T: Manganese	7439-96-5	1 mg/L	80.1	73.0	123
		EG020A-T: Nickel	7440-02-0	1 mg/L	89.5	80.0	118
		EG020A-T: Vanadium	7440-62-2	1 mg/L	89.5	81.0	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	88.6	74.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4062435)							
EM2124428-004	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	90.6	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4060401)							
EM2124209-022	Anonymous	EP080: C6 - C9 Fraction	---	280 µg/L	86.6	33.9	126
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4060401)							
EM2124209-022	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	78.5	34.0	122
EP080: BTEXN (QCLot: 4060401)							
EM2124209-022	Anonymous	EP080: Benzene	71-43-2	20 µg/L	109	56.3	133
		EP080: Toluene	108-88-3	20 µg/L	106	60.4	132

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	**EM2124453**	Page	1 of 8
Client	GEO-ENVIRONMENTAL SOLUTIONS	Laboratory	Environmental Division Melbourne
Contact	DR JOHN PAUL CUMMING	Telephone	+6138549 9640
Project	Scotts Rd	Date Samples Received	03-Dec-2021
Site	---	Issue Date	10-Dec-2021
Sampler	JOHN PAUL CUMMING	No. of samples received	8
Order number	---	No. of samples analysed	8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

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Work Order : EM2124453
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarises extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided below.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days; mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive re Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL** Evaluation: × = Holding time breach ; ✓ = Within holding time

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	---	---	---	08-Dec-2021	15-Dec-2021	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	09-Dec-2021	30-May-2022	✓	09-Dec-2021	30-May-2022	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	09-Dec-2021	29-Dec-2021	✓	10-Dec-2021	29-Dec-2021	✓

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Work Order : EM2124453
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Matrix: **SOIL** Evaluation: × = Holding time breach ; ✓ = Within holding time

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	08-Dec-2021	15-Dec-2021	✓	08-Dec-2021	17-Jan-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	08-Dec-2021	15-Dec-2021	✓	08-Dec-2021	17-Jan-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	08-Dec-2021	15-Dec-2021	✓	09-Dec-2021	15-Dec-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	08-Dec-2021	15-Dec-2021	✓	08-Dec-2021	17-Jan-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	08-Dec-2021	15-Dec-2021	✓	09-Dec-2021	15-Dec-2021	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
Pit 1 0.5m, Pit 1 1.5m, Pit 2 0.5m, Pit 2 1.5m, Pit 3 0.5m, Pit 4 0.5m, Duplicate	01-Dec-2021	08-Dec-2021	15-Dec-2021	✓	08-Dec-2021	15-Dec-2021	✓

Matrix: **WATER** Evaluation: × = Holding time breach ; ✓ = Within holding time

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T)							
Rinsate	01-Dec-2021	07-Dec-2021	30-May-2022	✓	07-Dec-2021	30-May-2022	✓

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Work Order	EM2124493
Client	GEO-ENVIRONMENTAL SOLUTIONS
Project	Scotts Rd

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T)							
Rinsate	01-Dec-2021	---	---	---	08-Dec-2021	29-Dec-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
Rinsate	01-Dec-2021	07-Dec-2021	08-Dec-2021	✓	08-Dec-2021	16-Jan-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
Rinsate	01-Dec-2021	07-Dec-2021	08-Dec-2021	✓	08-Dec-2021	16-Jan-2022	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate	01-Dec-2021	07-Dec-2021	15-Dec-2021	✓	07-Dec-2021	15-Dec-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
Rinsate	01-Dec-2021	07-Dec-2021	08-Dec-2021	✓	08-Dec-2021	16-Jan-2022	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate	01-Dec-2021	07-Dec-2021	15-Dec-2021	✓	07-Dec-2021	15-Dec-2021	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate	01-Dec-2021	07-Dec-2021	15-Dec-2021	✓	07-Dec-2021	15-Dec-2021	✓

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Work Order	EM2124493
Client	GEO-ENVIRONMENTAL SOLUTIONS
Project	Scotts Rd

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical batch(s) in which the submitted sample(s) was/were processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / Analytical Methods	Method	Count: QC	Count: Reference	Rate (%): Actual	Rate (%): Expected	Evaluation	Quality Control Specification
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / Analytical Methods	Method	Count: QC	Count: Reference	Rate (%): Actual	Rate (%): Expected	Evaluation	Quality Control Specification
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	16	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Control Samples (LCS) - Continued							
Total Mercury by FIMS	EG035T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	16	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : Scotts Rd

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICP/AES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015. Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020; ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015. The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3).
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270. Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).

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Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260. Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion: 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3).
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510. 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

24 Appendix 7 Certificate of Analysis

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EM2124453	Page	: 1 of 12
Client	: GEO-ENVIRONMENTAL SOLUTIONS	Laboratory	: Environmental Division Melbourne
Contact	: DR JOHN PAUL CUMMING	Contact	: Peter Ravlic
Address	: 29 KIRKSWAY PLACE BATTERY POINT TASMANIA, AUSTRALIA 7004	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6223 1839	Telephone	: +6138549 9645
Project	: Scotts Rd	Date Samples Received	: 03-Dec-2021 11:00
Order number	: ---	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: ---	Issue Date	: 10-Dec-2021 17:53
Sampler	: JOHN PAUL CUMMING		
Site	: ---		
Quote number	: EN/222		
No. of samples received	: 8		
No. of samples analysed	: 8		

ilac-MRA NATA

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, unless the sampling was conducted by ALS. 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
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

RIGHT SOLUTIONS | RIGHT PARTNER

ALS

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 reported 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.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) 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.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) 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.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

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Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Pit 1 0.5m	Pit 1 1.5m	Pit 2 0.5m	Pit 2 1.5m	Pit 3 0.5m
				Sampling date / time	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00
Compound	CAS Number	LOR	Unit		EM2124453-001	EM2124453-002	EM2124453-003	EM2124453-004	EM2124453-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	---	1.0	%		13.6	15.9	12.2	10.8	18.5
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg		20	20	20	20	90
Beryllium	7440-41-7	1	mg/kg		<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg		<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		11	9	8	8	23
Cobalt	7440-48-4	2	mg/kg		6	5	5	5	6
Copper	7440-50-8	5	mg/kg		35	55	37	45	26
Lead	7439-92-1	5	mg/kg		8	8	6	7	24
Manganese	7439-96-5	5	mg/kg		134	124	108	111	133
Nickel	7440-02-0	2	mg/kg		13	13	12	11	17
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg		26	21	21	18	31
Zinc	7440-66-6	5	mg/kg		46	72	51	59	33
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		0.7	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		0.8	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

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Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Pit 1 0.5m	Pit 1 1.5m	Pit 2 0.5m	Pit 2 1.5m	Pit 3 0.5m
				Sampling date / time	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00
Compound	CAS Number	LOR	Unit		EM2124453-001	EM2124453-002	EM2124453-003	EM2124453-004	EM2124453-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
* Sum of polycyclic aromatic hydrocarbons	---	0.5	mg/kg		2.0	<0.5	<0.5	<0.5	<0.5
* Benzo(a)pyrene TEQ (zero)	---	0.5	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5
* Benzo(a)pyrene TEQ (half LOR)	---	0.5	mg/kg		0.8	0.8	0.8	0.8	0.8
* Benzo(a)pyrene TEQ (LOR)	---	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	---	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	---	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	---	100	mg/kg		130	<100	<100	<100	<100
C29 - C36 Fraction	---	100	mg/kg		330	<100	<100	<100	110
* C10 - C36 Fraction (sum)	---	50	mg/kg		460	<50	<50	<50	110
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
* C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	---	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	---	100	mg/kg		330	<100	<100	<100	140
>C34 - C40 Fraction	---	100	mg/kg		430	<100	<100	<100	<100
* >C10 - C40 Fraction (sum)	---	50	mg/kg		760	<50	<50	<50	140
* >C10 - C16 Fraction minus Naphthalene (F2)	---	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
* Sum of BTEX	---	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
* Total Xylenes	---	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		96.0	---	91.2	90.1	93.5
2-Chlorophenol-D4	93951-73-6	0.5	%		78.9	---	67.5	74.7	67.4
2.4.6-Tribromophenol	118-79-6	0.5	%		86.6	---	82.2	88.3	100

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Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Pit 1 0.5m	Pit 1 1.5m	Pit 2 0.5m	Pit 2 1.5m	Pit 3 0.5m
				Sampling date / time	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00	01-Dec-2021 00:00
Compound	CAS Number	LOR	Unit		EM2124453-001	EM2124453-002	EM2124453-003	EM2124453-004	EM2124453-005
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		99.3	99.8	95.2	91.5	94.9
Anthracene-d10	1719-06-8	0.5	%		113	113	107	105	107
4-Terphenyl-d14	1718-51-0	0.5	%		107	101	96.7	96.3	99.5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		86.8	79.3	78.3	79.3	80.8
Toluene-D8	2037-26-5	0.2	%		95.2	86.8	86.4	88.9	89.4
4-Bromofluorobenzene	460-00-4	0.2	%		117	110	109	114	111

Page: 6 of 12
Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Pit 4 0.5m	Duplicate	---	---	---
				Sampling date / time	01-Dec-2021 00:00	01-Dec-2021 00:00	---	---	---
Compound	CAS Number	LOR	Unit		EM2124453-006	EM2124453-007	---	---	---
					Result	Result	---	---	---
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	---	1.0	%		19.5	12.2	---	---	---
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	---	---	---
Barium	7440-39-3	10	mg/kg		50	30	---	---	---
Beryllium	7440-41-7	1	mg/kg		<1	<1	---	---	---
Boron	7440-42-8	50	mg/kg		<50	<50	---	---	---
Cadmium	7440-43-9	1	mg/kg		<1	<1	---	---	---
Chromium	7440-47-3	2	mg/kg		38	9	---	---	---
Cobalt	7440-48-4	2	mg/kg		24	7	---	---	---
Copper	7440-50-8	5	mg/kg		43	40	---	---	---
Lead	7439-92-1	5	mg/kg		<5	9	---	---	---
Manganese	7439-96-5	5	mg/kg		360	133	---	---	---
Nickel	7440-02-0	2	mg/kg		34	15	---	---	---
Selenium	7782-49-2	5	mg/kg		<5	<5	---	---	---
Vanadium	7440-62-2	5	mg/kg		78	26	---	---	---
Zinc	7440-66-6	5	mg/kg		21	58	---	---	---
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	---	---	---
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	---	---	---
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	---	---	---
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	---	---	---
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	---	---	---
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	---	---	---
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	0.6	---	---	---
Pyrene	129-00-0	0.5	mg/kg		<0.5	0.7	---	---	---
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	---	---	---
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	---	---	---
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	---	---	---
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	---	---	---
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	---	---	---
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	---	---	---
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	---	---	---

Page: 7 of 12
Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Pit 4 0.5m	Duplicate	---	---	---
				Sampling date / time	01-Dec-2021 00:00	01-Dec-2021 00:00	---	---	---
Compound	CAS Number	LOR	Unit		EM2124453-006	EM2124453-007	------	------	------
					Result	Result	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	---	---	---
* Sum of polycyclic aromatic hydrocarbons	---	0.5	mg/kg		<0.5	1.3	---	---	---
* Benzo(a)pyrene TEQ (zero)	---	0.5	mg/kg		<0.5	<0.5	---	---	---
* Benzo(a)pyrene TEQ (half LOR)	---	0.5	mg/kg		0.6	0.6	---	---	---
* Benzo(a)pyrene TEQ (LOR)	---	0.5	mg/kg		1.2	1.2	---	---	---
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	---	10	mg/kg		<10	<10	---	---	---
C10 - C14 Fraction	---	50	mg/kg		<50	<50	---	---	---
C15 - C28 Fraction	---	100	mg/kg		<100	110	---	---	---
C29 - C36 Fraction	---	100	mg/kg		<100	270	---	---	---
* C10 - C36 Fraction (sum)	---	50	mg/kg		<50	380	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	---	---	---
* C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	---	---	---
>C10 - C16 Fraction	---	50	mg/kg		<50	<50	---	---	---
>C16 - C34 Fraction	---	100	mg/kg		<100	270	---	---	---
>C34 - C40 Fraction	---	100	mg/kg		<100	330	---	---	---
* >C10 - C40 Fraction (sum)	---	50	mg/kg		<50	600	---	---	---
* >C10 - C16 Fraction minus Naphthalene (F2)	---	50	mg/kg		<50	<50	---	---	---
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	---	---	---
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	---	---	---
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	---	---	---
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	---	---	---
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	---	---	---
* Sum of BTEX	---	0.2	mg/kg		<0.2	<0.2	---	---	---
* Total Xylenes	---	0.5	mg/kg		<0.5	<0.5	---	---	---
Naphthalene	91-20-3	1	mg/kg		<1	<1	---	---	---
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		92.6	91.9	---	---	---
2-Chlorophenol-D4	93951-73-6	0.5	%		96.0	78.2	---	---	---
2,4,6-Tribromophenol	118-79-6	0.5	%		96.1	48.0	---	---	---

Page: 8 of 12
Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Pit 4 0.5m	Duplicate	---	---	---
				Sampling date / time	01-Dec-2021 00:00	01-Dec-2021 00:00	---	---	---
Compound	CAS Number	LOR	Unit		EM2124453-006	EM2124453-007	------	------	------
					Result	Result	---	---	---
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		92.0	93.9	---	---	---
Anthracene-d10	1719-06-8	0.5	%		104	108	---	---	---
4-Terphenyl-d14	1718-51-0	0.5	%		96.8	101	---	---	---
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		75.1	86.8	---	---	---
Toluene-D8	2037-26-5	0.2	%		84.5	86.8	---	---	---
4-Bromofluorobenzene	460-00-4	0.2	%		109	95.3	---	---	---

Page: 9 of 12
Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate	—	—	—	—
				Sampling date / time	01-Dec-2021 00:00	—	—	—	—
Compound	CAS Number	LOR	Unit	EM2124453-008	------	------	------	------	------
				Result	—	—	—	—	—
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L	<0.001	—	—	—	—	—
Boron	7440-42-8	0.05	mg/L	<0.05	—	—	—	—	—
Barium	7440-39-3	0.001	mg/L	<0.001	—	—	—	—	—
Beryllium	7440-41-7	0.001	mg/L	<0.001	—	—	—	—	—
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	—	—	—	—	—
Cobalt	7440-48-4	0.001	mg/L	<0.001	—	—	—	—	—
Chromium	7440-47-3	0.001	mg/L	<0.001	—	—	—	—	—
Copper	7440-50-8	0.001	mg/L	<0.001	—	—	—	—	—
Manganese	7439-96-5	0.001	mg/L	<0.001	—	—	—	—	—
Nickel	7440-02-0	0.001	mg/L	<0.001	—	—	—	—	—
Lead	7439-92-1	0.001	mg/L	<0.001	—	—	—	—	—
Selenium	7782-49-2	0.01	mg/L	<0.01	—	—	—	—	—
Vanadium	7440-62-2	0.01	mg/L	<0.01	—	—	—	—	—
Zinc	7440-66-6	0.005	mg/L	<0.005	—	—	—	—	—
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	—	—	—	—	—
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L	<1.0	—	—	—	—	—
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	—	—	—	—	—
Acenaphthene	83-32-9	1.0	µg/L	<1.0	—	—	—	—	—
Fluorene	86-73-7	1.0	µg/L	<1.0	—	—	—	—	—
Phenanthrene	85-01-8	1.0	µg/L	<1.0	—	—	—	—	—
Anthracene	120-12-7	1.0	µg/L	<1.0	—	—	—	—	—
Fluoranthene	206-44-0	1.0	µg/L	<1.0	—	—	—	—	—
Pyrene	129-00-0	1.0	µg/L	<1.0	—	—	—	—	—
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	—	—	—	—	—
Chrysene	218-01-9	1.0	µg/L	<1.0	—	—	—	—	—
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	—	—	—	—	—
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	—	—	—	—	—
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	—	—	—	—	—
Indeno(1,2,3-cd)pyrene	193-39-5	1.0	µg/L	<1.0	—	—	—	—	—
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	—	—	—	—	—
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	—	—	—	—	—
* Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	—	—	—	—	—

Page: 10 of 12
Work Order: EM2124453
Client: GEO-ENVIRONMENTAL SOLUTIONS
Project: Scotts Rd

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate	—	—	—	—
				Sampling date / time	01-Dec-2021 00:00	—	—	—	—
Compound	CAS Number	LOR	Unit	EM2124453-008	------	------	------	------	------
				Result	—	—	—	—	—
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
* Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	—	—	—	—	—
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	—	—	—	—	—
C10 - C14 Fraction	----	50	µg/L	<50	—	—	—	—	—
C15 - C28 Fraction	----	100	µg/L	<100	—	—	—	—	—
C29 - C36 Fraction	----	50	µg/L	<50	—	—	—	—	—
* C10 - C36 Fraction (sum)	----	50	µg/L	<50	—	—	—	—	—
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	—	—	—	—	—
>C10 - C16 Fraction	----	100	µg/L	<100	—	—	—	—	—
>C16 - C34 Fraction	----	100	µg/L	<100	—	—	—	—	—
>C34 - C40 Fraction	----	100	µg/L	<100	—	—	—	—	—
* >C10 - C40 Fraction (sum)	----	100	µg/L	<100	—	—	—	—	—
* >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	—	—	—	—	—
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	—	—	—	—	—
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%	96.3	—	—	—	—	—
2-Chlorophenol-D4	93951-73-6	1.0	%	74.6	—	—	—	—	—
2,4,6-Tribromophenol	118-79-6	1.0	%	84.9	—	—	—	—	—
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%	80.3	—	—	—	—	—
Anthracene-d10	1719-06-8	1.0	%	75.6	—	—	—	—	—
4-Terphenyl-d14	1718-51-0	1.0	%	71.2	—	—	—	—	—

Page	11 of 12
Work Order	EM2124453
Client	GEO-ENVIRONMENTAL SOLUTIONS
Project	Scotts Rd

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate	—	—	—	—
				Sampling date / time	01-Dec-2021 00:00	—	—	—	—
Compound	CAS Number	LOR	Unit	EM2124453-008	------	------	------	------	
				Result	—	—	—	—	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	118	—	—	—	—	
Toluene-D8	2037-26-5	2	%	99.9	—	—	—	—	
4-Bromofluorobenzene	460-00-4	2	%	103	—	—	—	—	

Page	12 of 12
Work Order	EM2124453
Client	GEO-ENVIRONMENTAL SOLUTIONS
Project	Scotts Rd

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2,4,6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	59	124

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	51
2-Chlorophenol-D4	93951-73-6	30	114
2,4,6-Tribromophenol	118-79-6	26	133
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	35	127
Anthracene-d10	1719-06-8	44	122
4-Terphenyl-d14	1718-51-0	44	124
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

CIVIL DRAWINGS
SJAH DEVELOPMENT
COVE HILL ROAD
BRIDGEWATER

C001	COVER	B	23/04/2024
C103	SEWER AND WATER PLAN - SHEET 1	B	23/04/2024

REV	ISSUE	DATE	APPROVAL
			DRAWN: NM
			CHECKED: MG
			DESIGN: NM
B	PLANNING APPROVAL	23/04/2024	CHECKED: MG
A	PLANNING APPROVAL	9/04/2024	VERIFIED: MG

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PROJECT: SJAH DEVELOPMENT

ADDRESS: COVE HILL ROAD
BRIDGEWATER

CLIENT: THE YOUNG GROUP

SHEET: COVER

SCALE: AS INDICATED

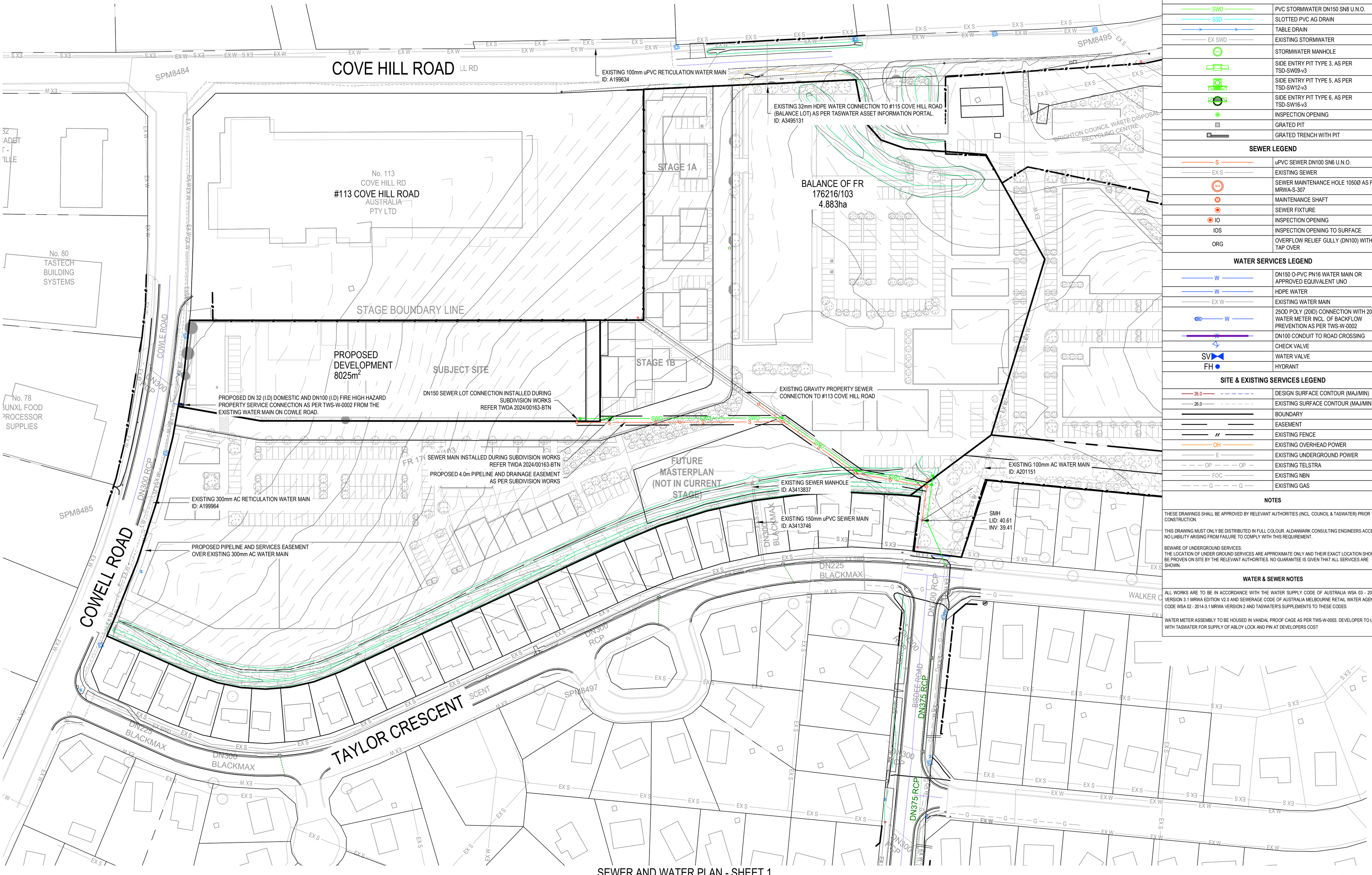
TOTAL SHEETS: 2

SIZE: A1

PROJECT No: 24 E 99 - 38

SHEET: C001

REV: B



SEWER AND WATER PLAN - SHEET 1

AS INDICATED

STORMWATER LEGEND

SWD	PVC STORMWATER DN150 SN8 U.N.O.
SSD	SLOTTED PVC AG DRAIN
	TABLE DRAIN
EX SWD	EXISTING STORMWATER
	STORMWATER MANHOLE
	SIDE ENTRY PIT TYPE 3, AS PER TSD-SW09-v3
	SIDE ENTRY PIT TYPE 5, AS PER TSD-SW12-v3
	SIDE ENTRY PIT TYPE 6, AS PER TSD-SW16-v3
	INSPECTION OPENING
	GRATED PIT
	GRATED TRENCH WITH PIT

SEWER LEGEND

S	uPVC SEWER DN100 SN6 U.N.O.
EX S	EXISTING SEWER
	SEWER MAINTENANCE HOLE 1050Ø AS PER MRWA-S-307
	MAINTENANCE SHAFT
	SEWER FIXTURE
IO	INSPECTION OPENING
IOS	INSPECTION OPENING TO SURFACE
ORG	OVERFLOW RELIEF GULLY (DN100) WITH TAP OVER

WATER SERVICES LEGEND

W	DN150 O-PVC PN16 WATER MAIN OR APPROVED EQUIVALENT UNO
W	HDPE WATER
EX W	EXISTING WATER MAIN
W	25OD POLY (20ID) CONNECTION WITH 20mm WATER METER INCL. OF BACKFLOW PREVENTION AS PER TWS-W-0002
W	DN100 CONDUIT TO ROAD CROSSING
	CHECK VALVE
SV	WATER VALVE
FH	HYDRANT

SITE & EXISTING SERVICES LEGEND

26.0	DESIGN SURFACE CONTOUR (MAJ/MIN)
26.0	EXISTING SURFACE CONTOUR (MAJ/MIN)
	BOUNDARY
	EASEMENT
	EXISTING FENCE
OH	EXISTING OVERHEAD POWER
E	EXISTING UNDERGROUND POWER
OP OP	EXISTING TELSTRA
FOC	EXISTING NBN
G G	EXISTING GAS

NOTES

THESE DRAWINGS SHALL BE APPROVED BY RELEVANT AUTHORITIES (INCL. COUNCIL & TASWATER) PRIOR TO CONSTRUCTION.

THIS DRAWING MUST ONLY BE DISTRIBUTED IN FULL COLOUR. ALDANMARK CONSULTING ENGINEERS ACCEPTS NO LIABILITY ARISING FROM FAILURE TO COMPLY WITH THIS REQUIREMENT.

BEWARE OF UNDERGROUND SERVICES:
THE LOCATION OF UNDER GROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT LOCATION SHOULD BE PROVEN ON SITE BY THE RELEVANT AUTHORITIES. NO GUARANTEE IS GIVEN THAT ALL SERVICES ARE SHOWN.

WATER & SEWER NOTES

ALL WORKS ARE TO BE IN ACCORDANCE WITH THE WATER SUPPLY CODE OF AUSTRALIA WSA 03 - 2011-3.1 VERSION 3.1 MRWA EDITION V2.0 AND SEWERAGE CODE OF AUSTRALIA MELBOURNE RETAIL WATER AGENCIES CODE WSA 02 - 2014-3.1 MRWA VERSION 2 AND TASWATER'S SUPPLEMENTS TO THESE CODES

WATER METER ASSEMBLY TO BE HOUSED IN VANDAL PROOF CAGE AS PER TWS-W-0003. DEVELOPER TO LIAISE WITH TASWATER FOR SUPPLY OF ABLOY LOCK AND PIN AT DEVELOPERS COST

DIAL BEFORE YOU DIG www.1100.com.au

REV	ISSUE	DATE	APPROVAL	
			DRAWN:	NM
			CHECKED:	MG
			DESIGN:	NM
B	PLANNING APPROVAL	23/04/2024	CHECKED:	MG
A	PLANNING APPROVAL	9/04/2024	VERIFIED:	MG

ALDANMARK CONSULTING ENGINEERS
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PROJECT: SJAH DEVELOPMENT

ADDRESS: COVE HILL ROAD
BRIDGEWATER

CLIENT: THE YOUNG GROUP

0 1 2 3 4 5 6 7 8 9 10m

SHEET: SEWER AND WATER PLAN - SHEET 1

SCALE: AS INDICATED | TOTAL SHEETS: 2 | SIZE: A1

PROJECT No: 24 E 99 - 38 | SHEET: C103 | REV: B