



Aliro Trusco 1 Pty Ltd
care of
Aliro Management Pty Ltd

Remedial Action Plan
13 Endeavour Road, Caringbah, NSW

11 November 2021

58037/142034

JBS&G Australia Pty Ltd

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Abbreviations

Term	Definition
ACM	Asbestos Containing Material
AHD	Australian Height Datum
ASC NEPM	National Environmental Protection (Assessment of Site Contamination) Measure
ASS	Acid Sulfate Soils
AST	Above Ground Storage Tank
Bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CEC	Cation Exchange Capacity
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DO	Dissolved Oxygen
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
EC	Electrical Conductivity
Eh	Redox Potential
EIL	Ecological Investigation Levels
Envirolab	Envirolab Services Pty Ltd
EPA	NSW Environment Protection Authority
ESA	Environmental Site Assessment
ESL	Ecological Screening Levels
Eurofins	Eurofins MGT
GIL	Groundwater Investigation Levels
GME	Groundwater Monitoring Event
ha	Hectare
HGG	Hazardous Ground Gas
HIL	Health Investigation Levels
HSL	Health Screening Levels
JBS&G	JBS&G Australia Pty Ltd
LCS	Laboratory Control Sample
LEP	Local Environmental Plan
LOR	Limit of Reporting
NATA	National Association of Testing Authorities
NEPC	National Environmental Protection Council
OCP	Organochlorine Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness and Sensitivity
PCB	Polychlorinated Biphenyls
PFAS	per- and poly- fluoroalkyl substances
pH	Potential of Hydrogen
PID	Photo-ionisation Detector
ppm	Parts Per Million
QA/QC	Quality Assurance / Quality Control
RAP	Remedial Action Plan
RPD	Relative Percent Difference
SWL	Standing Water Level
SAQP	Sampling, Analysis and Quality Plan
SMP	Site Management Plan
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
UPSS	Underground Petroleum Storage Systems
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

Executive Summary

JBS&G Australia Pty Ltd (JBS&G) has been engaged by Aliro Trusco 1 Pty Ltd (Aliro 1, the client) care of Aliro Management Pty Ltd (Aliro Management) to prepare a remedial action plan (RAP) for a property located at 13 Endeavour Road, Caringbah, NSW (the site). The site is legally identified as Lot 2 in Deposited Plan (DP) 714965 and occupies an area of 12.5 hectares (ha). The site location and site layout are shown in **Figures 1 and 2**, respectively.

The site has been the subject of previous environmental investigations (JBS&G 2020a¹) which reported the majority of the site had been extensively filled with approximately 2 m of gravelly sand/clay/sandstone between 1961 to 1965 as part of regional reclamation of low-lying land adjacent to Woolloomooloo Bay. Natural/reworked natural material underlying fill was identified to comprise a combination of organic rich estuarine sediments (former reclaimed tidal mangroves) and alluvial silty clays which were identified to be potential and actual acid sulfate soils (P/ASS).

The site has been identified as impacted by an historically abandoned underground petroleum storage system (UPSS) and a localised area of asbestos impact adjoining the centre of the site's eastern boundary. Elevated levels of ground gases (methane and carbon dioxide) were identified on the site, however, through a detailed assessment of the gas concentrations, flow rates and the conceptual site model (CSM), the site was reported to pose a 'very low risk' and not requiring specific ground gas-related remediation/management.

The site is proposed to undergo staged redevelopment for mixed land uses (commercial/industrial, retail, entertainment and community uses inclusive of a commercial hotel). Stage 1 redevelopment activities proposed under Development Application (DA21/0777) will include removal of historic UPSS, the adaptive reuse of existing Warehouse E1 (with some alterations and additions) and minor augmentation to existing peripheral driveways/carparks, hardstand pavements and landscaped areas. Based on review of detailed cut to fill design plans (**Appendix A**), development activities will generally involve shallow excavation of overlying fill materials (typically to less than 2 m below ground surface).

To render the site suitable for its proposed land use, remediation/management of identified contamination issues are required. Remediation works are proposed to be staged to align with redevelopment staging.

This document presents a RAP that outlines the principles of remedial/validation works required for the site, that when completed, will make and demonstrate the site as suitable for the proposed land use.

This RAP has been prepared with reference to relevant guidelines made or endorsed by the NSW Environment Protection Authority (EPA) inclusive of NEPC (2013²) and also the requirements of SEPP 55³.

¹ Aliro Trusco 1 Pty Ltd c/- Aliro Management Pty Ltd – Detailed Site Investigation, Toyota Caringbah 13 Endeavour Road, Caringbah, NSW. Prepared by JBS&G Australia Pty Ltd ref. 58037/132083 Revision A dated 9 September 2020 (JBS&G 2020a)

² National Environment Protection (Assessment of Site Contamination) Measure, Amendment No 1 (2013). National Environment Protection Council (NEPC 2013)

³ Managing Land Contamination – Planning Guidelines SEPP 55 Remediation of Land. Department of Urban Affairs and Planning. Environment Protection Authority 1998 (DUAP 1998)

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) has been engaged by Aliro Trusco 1 Pty Ltd (Aliro 1, the client) care of Aliro Management Pty Ltd (Aliro Management) to prepare a remedial action plan (RAP) for a property located at 13 Endeavour Road, Caringbah, NSW (the site). The site is legally identified as Lot 2 in Deposited Plan (DP) 714965 and occupies an area of 12.5 hectares (ha). The site location and site layout are shown in **Figures 1 and 2**, respectively.

The site has been the subject of previous environmental investigations (JBS&G 2020a⁴) which reported the majority of the site had been extensively filled with approximately 2 m of gravelly sand/clay/sandstone between 1961 to 1965 as part of regional reclamation of low-lying land adjacent to Woolloomooloo Bay. Natural/reworked natural material underlying fill was identified to comprise a combination of organic rich estuarine sediments (former reclaimed tidal mangroves) and alluvial silty clays which were identified to be potential and actual acid sulphate soils (P/ASS).

The site has been identified as impacted by an historically abandoned underground petroleum storage system (UPSS) and a localised area of asbestos impact adjoining the centre of the site's eastern boundary. Elevated levels of ground gases (methane and carbon dioxide) were identified on the site, however, through a detailed assessment of the gas concentrations, flow rates and the conceptual site model (CSM), the site was reported in JBS&G (2020a) to pose a 'very low risk' and not requiring specific ground gas remediation/management.

The site is proposed to undergo staged redevelopment for mixed land uses (commercial/industrial, retail, entertainment and community uses inclusive of a commercial hotel). Stage 1 redevelopment activities proposed under Development Application (DA21/0777) will include removal of historic UPSS, the adaptive reuse of existing Warehouse E1 (with some alterations and additions) and minor augmentation to existing peripheral driveways/carparks, hardstand pavements and landscaped areas. Based on review of detailed cut to fill design plans (**Appendix A**), development activities will generally involve shallow excavation of overlying fill materials (typically to less than 2 m below ground surface). This document presents a RAP that outlines the principles of remedial/validation works required for the site, that when completed, will make and demonstrate the site as suitable for the proposed land use.

This RAP has been prepared with reference to relevant guidelines made or endorsed by the NSW Environment Protection Authority (EPA) inclusive of NEPC (2013⁵) and also the requirements of SEPP 55⁶.

1.2 Objective

objectives of this RAP are to:

- Characterise and document the known extent of environmental impact within the site via presentation of a CSM;
- Identify the remedial strategy(ies)/framework to be adopted by an assessment of remedial options and development objectives; and

⁴ Aliro Trusco 1 Pty Ltd c/- Aliro Management Pty Ltd – Detailed Site Investigation, Toyota Caringbah 13 Endeavour Road, Caringbah, NSW. Prepared by JBS&G Australia Pty Ltd ref. 58037/132083 Revision A dated 9 September 2020 (JBS&G 2020a)

⁵ National Environment Protection (Assessment of Site Contamination) Measure, Amendment No 1 (2013). National Environment Protection Council (NEPC 2013)

⁶ Managing Land Contamination – Planning Guidelines SEPP 55 Remediation of Land. Department of Urban Affairs and Planning. Environment Protection Authority 1998 (DUAP 1998)

- Document the procedures and standards to be followed in order to remove the risks posed by contaminated soils/infrastructure to make the site suitable for suitable for the proposed development, while ensuring the protection of human health and the surrounding environment.

1.3 Proposed Development

As discussed in **Section 1.1** a multi-use development is proposed, the layout of which is shown on **Figure 3**.

Under the current development, it is proposed to retain Warehouse E1 which is present over the central and north-western portion of the site and maintain the existing internal road network. Minor augmentations to other site infrastructure, including roadways and access driveways is proposed.

Future redevelopment will include demolition of other small structures which will be replaced with new multi-storey buildings, typically present over the north-eastern, eastern, central and south-western portions of the site.

2. Site Condition, History & Surrounding Environment

2.1 Site Identification

The location of the site is shown in **Figure 1**. The current layout is shown in **Figure 2** and the proposed site development layout is shown on **Figure 3**. Site details are summarised in **Table 2.1** and discussed in detail in the following section.

Table 2.1: Summary of Site Details

Site Legal Identifier (as shown on Figure 2)	Lot 2 DP 714965
Site Address	13 Endeavour Road, Caringbah, NSW
Site Area (approximate)	Approximately 12.5 ha
Local Government Authority	Sutherland Shire Council
Site Geographic Coordinates (MGA 56)	Easting: 340210.89 Northing: 1510802.86
Current Zoning	B7 Business Park – Sutherland Shire Council Local Environmental Plan (LEP) 2015
Current Land Use	Commercial/Industrial
Proposed Land Use	Commercial/Industrial incl of a Childcare centre

2.2 Current Site Condition

A detailed site inspection was completed on 9 May 2020 by JBS&G. The following key features, as documented in JBS&G (2020) and shown on **Figure 2**, were reported:

- A large main warehouse was observed within the centre of the site and understood to be used as a motor vehicle spare parts storage and distribution centre. It is understood the warehouse was constructed between 1984 and 1989 and is proposed to be retained with the redevelopment of the site;
- Surrounding the large main warehouse were several smaller buildings as understood to be used for a range of commercial and educational purposes associated with Toyota's former operations in Australia;
- 'The Hub' as located to the within the central portion of the site and noted to contain a car wash and detailing area. A small ground separator was reported to be present within the western extent of The Hub which was bunded to capture spill and grey water associated with car washing;
- Various maintenance and storage sheds were reported along the western site boundary. A former 10kL diesel underground storage tank (UST) (vent and fill points were still apparent) was reported between two sheds. The UST is reported to have been historically abandoned and is potentially still in place on this portion of the site;
- Two small diesel aboveground storage tanks (ASTs) were also reported to be present within the building/sheds housing the diesel backup generator adjoining the centre of north-western boundary of the site; and
- The balance of the site comprised paved extents (driveways and car parking), landscaped areas (garden beds and lawn areas) and a small putting green (golf course).

2.3 Surrounding Land Use

The current land uses of adjacent properties or properties across adjacent roadways are summarised below.

- North – Woollooware Bay and associated mangroves, and to northwest there are commercial/industrial premises including automotive workshops, welding workshops, packaging and air conditioning companies;
- East – The site is bound to the east by the Solander Playing Fields and Cronulla RSL Youth Soccer Club. Further afield is Dune Walk, across which are residential apartments then Shark/Toyota Park and leagues club;
- South – The site is bound to the south and southwest by Captain Cook Drive, across which are low density residential lands, with playing fields and Woollooware Golf Club to the southeast; and
- West – The site is bound to the west and northwest by Endeavour Road with commercial facilities and Captain Cook Drive beyond. Further afield are some commercial/industrial premises and low-density residential lands.

2.4 Natural Site Setting

The environmental setting of the site is presented in **Table 2.2**.

Table 2.1: Summary of Environmental Characteristics

Environmental Aspect	Characteristics
Topography	<p>A review of topographical information available on SIX Maps⁷ indicates that the site is generally flat with an elevation of approximately 3 m Australian Height Datum (AHD) and gently falls towards the northeast/Woollooware Bay. An area (comprising the putt putt golf course) close to the northeast boundary was elevated above the surrounding site area by approximately 2-3 m.</p> <p>Land to the west of the site, across Captain Cook Drive, was reported to be elevated approximately 2 m above the site levels.</p>
Hydrology	<p>The nearest surface water receptor is Woollooware Bay located directly to the north of the site (marine ecosystem).</p> <p>Existing pavements occupy the majority of the site. As such, rainfall within the site is anticipated to generally be controlled by the current stormwater network, draining towards municipality's stormwater infrastructure before being discharged to Woollooware Bay.</p> <p>In unsealed sections of the site, rainfall is expected to infiltrate the relatively permeable sandy fill soils, with the overflow surface water (following soil saturation) anticipated to enter the regional stormwater system.</p>
Geology	<p>A review of the 1:100 000 scale Wollongong – Port Hacking Geological Map (DMR 1985⁸) identifies the site is underlain by man-made fill and organic-rich muddy, mostly "marine" sand. Man-made fill typically but not always comprises dredged estuarine sand and mud, coal washing, inclusions of industrial and household mixed waste whereas the organic-rich muddy "marine" sand typically overlaid clean to muddy, shelly "marine" sand, sometimes with low dunes, then medium to fine-grained "marine" sand with podzols and shelly layers.</p> <p>Reference to the online ESPADE 2.0 tool hosted by OEH (OEH 2019⁹) indicated the site is underlain by disturbed terrain. The disturbed terrain landscape group characterises areas having been subject to removal of natural soils or greatly disturbed or buried natural soils often associated with quarries, tips, land reclamation and large cut-to-fill features. Soils within this group typically comprise imported or reclaimed soils, rock, building and waste materials. This may result in soils with characteristics including high variability, engineering hazards, unconsolidated low bearing strength materials, permeability, poor drainage, very low fertility, toxic materials and wind erosion hazard. Soils within this landscape group may also be sources of sediment and groundwater contamination.</p>

⁷ <http://maps.six.nsw.gov.au/>, Six Maps. Accessed by JBS&G on 21 July 2020

⁸ Wollongong – Port Hacking Geological Series Sheet 9029-9129 (Edition 1) 1983. Department of Mineral Resource, Geological Survey of NSW (DMR 1983)

⁹ ESPADE 2.0. NSW Office of Environment and heritage, Accessed 11 August 2020 (OEH 2019)

Environmental Aspect	Characteristics
	<p>Previous investigations (Section 2.6) confirmed the presence of fill (sand/sandstone) at an average thickness of 2 m across the site associated with former land reclamation activities. Underlying materials were noted to comprise organic rich sandy clays (peaty muds) and estuarine sands associated with former mangrove swamps/coastal saltmarsh. Alluvial/marine silty sands were unidentified underlying organic rich sediments with sandstone bedrock identified at relatively shallow depths toward the southern portion of the site, increasing in depth toward the north east (Woollooware Bay).</p>
Acid Sulfate Soils (ASS)	<p>Review of the Port Hacking Acid Sulfate Soil Risk Map ¹⁰ indicates that the site is located within an area classed as 'disturbed terrain'. Areas having this classification may include filled areas which often occur following reclamation of low-lying swamps for urban development. Other areas with this classification may include areas which have been mined, dredged, or have undergone heavy ground disturbance through general urban development.</p> <p>Review of the Sutherland Local Environmental Plan (LEP) 2015 online portal¹¹ indicates that the site falls within a category classified as Class 3 ASS. According to the LEP, development consent is required for any works in a Class 3 ASS area that extend beyond 1 metre below the natural ground surface and which are likely to lower the water table more than 1 m below ground surface (bgs). Such works would trigger the requirement for assessment and may require ASS management unless preliminary assessment indicates management is not required. It is noted that land within a category classified as Class 1 and 2 are located directly adjacent the site (mangroves associated with Woollooware Bay).</p> <p>JBS&G's (2020a) assessment of natural/reworked/reclaimed soils across the site indicated that the majority of reworked/natural soils comprise silty sands and organic rich sandy clays characterised as P/ASS. Field screening and laboratory results identified materials at depth of between 2 -3 m bgs (silty sands/organic rich sandy clays) contain P/ASS properties with moderate drops in pH_f values reported in organic rich sediments and underlying silty sands which exhibited a moderate to strong organic odour. Soil samples submitted for suspension peroxide oxidation combined acidity and sulfur (SPOCAS) analysis reported acid trails ranging between 98 mol H⁺/T and 280 mol H⁺/T and sulfur trails ranging between 0.01 %S and 0.71 %S. PASS was identified to the maximum depth of previous investigation (6.8 m bgs).</p> <p>An Acid Sulfate Soil Management Plan (ASSMP) has been prepared (JBS&G 2020b¹²) to manage the presence of P/ASS (if disturbed).</p>
Hydrogeology	<p>Previous investigations reported groundwater at depths of approximately 1.0 to 4.5 m bgs. A review of the Water NSW groundwater mapping portal (Water NSW 2020¹³) indicates 20 registered groundwater bores are situated within a 1.5 km radius of the site. The bores were noted to be used for monitoring purposes with groundwater ranging in depths from 0.5 m bgs to >5 m.</p> <p>Based on previous investigations, groundwater within the fill/alluvial sediments is expected to flow to the northeast towards Woollooware Bay and encountered at depths between 0.5 and 5 m AHD.</p>

2.5 Summary Site History

A review of aerial photos, discussions with representatives of the former site operators, heritage records and records held by government agencies has been previously undertaken in JBS&G (2020a). On the basis of these reviews it has been found that the site was generally vacant comprising mangroves and vegetated areas until 1965, when reclamation activities were observed along the coastline associated with the surrounding urban development. The whole site area to the northern boundary had been filled by 1965, as had the land immediately northwest and southeast. The site was purchased by Toyota in 1982 as a storage and training facility. Toyota commenced construction of the first portion of the warehouse in approximately 1986 and extended in 1989 to the current size.

¹⁰ Port Hacking Acid Sulfate Soil Risk Map (Edition 2), Department of Land and Water Conservation, December 1997 (DLWC 1997)

¹¹ <https://maps.ssc.nsw.gov.au/LEP/>. Sutherland Shire Council LEP 2015 Online Portal. Accessed on 11 August 2020

¹² Toyota Caringbah Acid Sulfate Soil Management Plan. Prepared by JBS&G Australia Pty Ltd ref.58037/130619 Revision 0 dated 22 July 2020 (JBS&G 2020b)

¹³ Groundwater Monitoring Overview Map. <https://realtime.data.watarnsw.com.au/>. Accessed 11 August 2020. Water NSW, 2020.

Searches of dangerous goods records have reported:

- A single diesel UST located within the central northern portion of the site, indicated to have been decommissioned/abandoned by previous assessments; and
- Chemicals associated with the on-site wash bay and interceptor in the central portion of the site.

2.6 Previous Investigations

A number of assessment reports, prepared by others, have been summarised in third party reports or made available for review by JBS&G. The following sections provide a summary of the information and site characterisation data presented within key assessment reports. These reports include both historical and information relating to investigations conducted at that time.

Comments in relation to contaminants of potential concern (COPC) are provided in the following text in relation to assessment criteria adopted by the author at the time of report preparation. This comprises the range of health investigation levels presented in NEPC (1999¹⁴) and EPA (1994¹⁵) for investigation results generally up to and including the end of 2012; ANZECC (2000¹⁶) for groundwater thresholds until 2018; and NEPC (2013) and ANZG (2018¹⁷) for results from 2012 and 2019, respectively.

Historical analytical summary tables are included in **Appendix B**. Historical field logs are provided in **Appendix C**.

2.6.1 Geotechnical and Environmental Assessment Report (Golder 1998¹⁸)

This report was not cited by JBS&G. The following is a summary of information presented in AECOM (2019¹⁹).

Golder Associates Pty Ltd (Golder 1998²⁰) were engaged by Toyota to prepare a geotechnical and environmental assessment report of the site to identify the ground conditions in preparation for proposed extensions including new offices warehouse buildings and car park facilities comprising the current Toyota House, Links House and the Hub.

The scope of works included review of historical information, a site inspection, advancement of fifteen test pits (GA1 to GA15, as shown in **Figure 4**), soil sampling and analysis for heavy metals, total petroleum hydrocarbon (TPH), organochlorine pesticides (OCPs), soil pH and net acid generation.

Golder (1998) reported the following with regard to the environmental status of the site:

- All test pits were excavated to a depth of 3 m bgs;
- The lithology was noted to comprise 100 mm of topsoil followed by graded mixture of sand with fines, clay and crushed sandstone (depth unknown);

¹⁴ *National Environment Protection (Assessment of Site Contamination) Measure, 1999*. National Environment Protection Council, 1999 (NEPC 1999)

¹⁵ *Contaminated Sites: Guidelines for Assessing Service Station Sites*. NSW EPA December 1994 (EPA 1994)

¹⁶ *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1*. Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand, October 2000 (ANZECC 2000)

¹⁷ *Australia and New Zealand Guidelines for Fresh & Marine Water Quality 2018 (ANZG 2018)*

¹⁸ *Geotechnical and Preliminary Contamination Investigation. Proposed development areas of Toyota Facility Captain Cook Drive Woollooware Bay*. Golder Associates Pty Ltd dated August 1998 (Golder 1998)

¹⁹ *Toyota Caringbah, Phase 1 & 2 Environmental Site Assessment 2019 – 13 Endeavour Road, Caringbah, NSW*. AECOM Australia Pty Ltd dated 28 October 2019 (AECOM 2019)

²⁰ *Geotechnical and Preliminary Contamination Investigation. Proposed development areas of Toyota Facility Captain Cook Drive Woollooware Bay*. Golder Associates Pty Ltd dated August 1998 (Golder 1998)

- Golder indicated that fill had been placed over natural sand, organic material (former mangroves) and/or vegetated surfaces;
- Soil pH was measured to range from 7.2 to 8.0 representing a slightly basic environment (assumed to be imported material rather than natural material at depth); and
- All samples analysed reported concentrations below the adopted commercial/industrial land use criteria (NEPC 1999 and EPA 1994). It was also reported there was a low likelihood of P/ASS.

Golder (1998) presented a detailed geotechnical assessment of underlying sediments (based on core samples collected across the site) which identified the following stratigraphy/lithologies:

- Sandy fill to between 4 and 0 m AHD – contains some building rubble (non-putrescible);
- Peat (peaty sand/clay) from 1 to 2 m AHD – estuarine and marine deposits with some grey sand (shell inclusions) above and below;
- Sand and silty/sandy clays between 0 to 10 m AHD – dune sands with some lenses of peat;
- Sands and sandy clays between -6 to -23 m AHD – generally inorganic with some shells;
- Clayey sands/sandy clays (residual Hawkesbury Sandstone); and
- Quartz rich sandstone bedrock.

The data presented indicates sandy fill material overlies natural peat (organic rich clay/sand) which reported an average thickness of 1 m. Deeper sediments comprised alluvial/estuarine and marine sands/clays which extend to termination on underlying Hawkesbury Sandstone. The reported lithology is considered consistent with the review of the site history and natural setting provided above.

2.6.2 Soil Quality Assessment (CES 2005²¹)

This report was not cited by JBS&G. The following is a summary of information presented in AECOM (2019).

Consulting Earth Sciences Pty Ltd (CES 2005) were engaged by Toyota to undertake soil characterisation activities in proximity to a proposed 10 m x 60 m x 2 m in depth underground water holding tank along the western boundary of the site adjacent Endeavour Road. Based on review of AECOM (2019) it is unclear if this was installed, and JBS&G did not observe clear evidence of such a feature during inspection of the site.

The scope of works included drilling of eight boreholes (BH1 to BH8, shown in **Figure 4**) to a maximum of 2.4 m bgs, soil sampling and analysis for heavy metals, TPH, benzene, toluene ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), OCP, organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCB) and potential for ASS. Additional Toxicity Characteristic Leachate Procedures (TCLP) were also scheduled for heavy metals and PAHs to provide a waste classification in accordance with NSW waste classification guidelines (EPA 1999²²) in force at the time.

CES (2005) noted the site soil comprised sandy silt topsoil overlying sandy fill material with gravel in the upper 1 m underlain at 1.8 m bgs by sandy clay and silty clay estuarine sediments. No asbestos was identified. All samples reported concentrations within the “inert waste” classification in accordance with the EPA (1999) waste classification guidelines and low likelihood of P/ASS.

²¹ *Soil Quality Assessment – Proposed Water Holding Tank Construction Area, Toyota Headquarters Caringbah NSW*. Consulting Earth Sciences dated 7 December 2005 (CES 2005)

²² *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes*. NSW EPA (1999)

2.6.3 Targeted Soil Contamination Assessment (NA 2012²³)

This report was not cited by JBS&G. The following is a summary of information presented in AECOM (2019).

Noel Arnold and Associates (NA 2012) were engaged by Toyota to prepare a targeted soil contamination assessment to identify if significant contamination was present in soils immediately surrounding the previously removed UST, formerly located along the western boundary of the site (as shown in **Figure 2**).

The scope of works included drilling of four boreholes (SB01 to SB04, **Figure 4**) to a maximum of 4 m bgs on each side of the former UST location, soil sampling and analysis for lead, TPH, BTEX and PAH, and submission of a dangerous good search from Workcover NSW (now SafeWork NSW).

NA (2012) noted soil comprised sandy silt topsoil from 0.1 to 0.4 m bgs, overlying sandy fill material with clay and gravel to the depth of 1.7 m bgs and underlain by grey silty sand (estuarine sediments) containing strong sulfuric odour. All samples reported concentration below the adopted EPA (1994) criteria in force at the time.

Dangerous Goods Search documentation provided by Workcover NSW on 16 February 2012 did not identify the presence of any petroleum infrastructure at the site. AECOM (2019) noted that previous records indicated the UST was decommissioned in 2003 as confirmed by a UPSS removal certificate, however the certificate was not made available to JBS&G for review. Notwithstanding, NA (2012) indicated that a visual inspection of the tank found white foam protruding from the fill point, consistent with the reported methodology for decommissioning.

NA (2012) included a tank integrity report which was prepared by OPEC Systems Pty Ltd (OPE 2003) presumably prior to decommissioning of the tank. The integrity assessment report identified serious ruptures in the UST lining and evidence of ingress.

NA (2012) recommended that should the tank be removed, it be done so in accordance with relevant EPA made or endorsed regulations/Australian standards and should areas of potential soil or groundwater contamination be identified, a suitably qualified environmental consultant be contacted, and appropriate investigations undertaken.

2.6.4 Hazardous Building Materials Survey (BV 2018²⁴)

Bureau Veritas HSE Pty Ltd (BV) was engaged by Toyota to conduct a hazardous materials survey report (BV 2018) for the site in September 2018.

Non-friable asbestos containing material (ACM) was reported at a number of locations. Synthetic mineral fibres (SMF) were presumed or identified in various materials. BV noted that it was considered unlikely lead-based paints or PCB containing capacitors in fluorescent lights fittings to be present on site given the age of the warehouses, whereas Ni-Cd batteries can be present in uninterrupted power supplies on site.

BV recommended identified and suspected ACM and SMF should be left undisturbed as far as practical, should disturbance be required, appropriate control measures and protocols should be followed in accordance with the *Work Health and Safety Regulations 2017* and National Occupational Health and Safety Commission (NOHSC) *National Code of Practice for the Safe Use of Synthetic Mineral Fibre Products 1990*, respectively.

²³ Targeted Soil Contamination Assessment, Toyota Motor Corporation Australia Ltd, Corner Captain Cook Drive and Gannons Road Caringbah NSW. Noel Arnold and Associates dated February 2012 (NA 2012)

²⁴ Hazardous Building Materials Survey – Toyota Australia Woollooware Bay. Bureau Veritas HSE dated September 2018 (BV 2018)

2.6.5 Stage 1 and 2 Environmental Site Assessment (AECOM 2019)

AECOM Australia Pty Ltd (AECOM) were engaged by Toyota to prepare a combined Stage 1 and 2 Environmental Site Assessment (ESA, AECOM 2019) of the site. The objectives of the combined ESA were to obtain and review available historical and current site information, identify and address data gaps and uncertainties for potential contamination of the site.

The combined ESA report comprised a desktop assessment including review of previous environmental reports supplied by Toyota. Based on the review of historical information for the site, it appeared that the site was historically vacant land, potentially used by locals to access Woollooware Bay and/or for dumping household waste, lawn clippings etc. The site was then extensively filled with generally clayey, gravelly coarse sand and crushed sandstone to close to current site levels and developed by Toyota as automotive workshops (commercial/industrial use) since 1982.

Site investigation works were then undertaken from 5 May to 13 September 2019. The field program comprised a detailed site inspection, advancement of twenty-four boreholes (BH1 to BH24, **Figure 4**), conversion of five boreholes into groundwater monitoring wells (MW1 to MW5, **Figure 4**) and soil and groundwater sampling. Selected soil samples were analysed for heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP, volatile organic compounds (VOCs) and asbestos, whereas groundwater samples were analysed for heavy metals, TRH, BTEX, PAH and phenols.

Fill materials were encountered across the site to depths ranging from 1.6 (BH14/MW4) to 3.5 m bgs (BH6/MW3), comprising topsoil, fine to coarse grained sand/gravelly sand with some anthropogenic inclusions of tile fragments, brick fragments, concrete fragments and sandstone cobbles observed at location BH3/MW2, BH5, BH14/MW4, BH18, BH19 and BH24, underlain by dark grey or black medium plasticity sandy silt/silt (estuarine sediments) with inclusions of high organic content to a maximum depth of 5.5 m bgs (BH14/MW4) at most locations. Natural light brown/grey sand were encountered at 1.25 m bgs (BH10) according to the logs. Sulfuric odour was generally identified within the underlying dark grey/black estuarine sediments layer. No staining was observed in any locations. ACM fragments were identified at sample location BH24 to a depth of 2.4 m bgs. High photo-ionisation detector (PID) readings were obtained at BH20/MW5 at 3 m bgs (83.6 ppm) and BH17 at 2.5 m bgs (271.4 ppm) which was located adjacent to the wash bay and interceptor, however no elevated TRH or VOCs were reported in BH17 samples or BH20/MW5 shallower soil samples.

Groundwater was encountered between 1.58 (MW2) to 4.1 m bgs (MW4) during intrusive works, while the standing water level (SWL) were reported between 0.589 (MW2) and 0.834 m AHD (MW5) during groundwater sampling event. No hydrocarbon odour or sheen were observed in any groundwater samples, however, sulfur odour was noted at sample locations MW1 and MW2.

All soil and groundwater concentrations were reported within the human health and ecological site criteria for commercial/industrial land (NEPC 2013). ACM fragments observed at location BH24 were reported to contain the presence of chrysotile, amosite and crocidolite asbestos. However, laboratory certificates were not included in AECOM (2019) to verify their discussion and summary tables of analytical data.

JBS&G note that AECOM (2019) adopted ANZG (2018²⁵) 95% Protection of Species Trigger Values for Freshwater Aquatic Ecosystems for arsenic, 0.024 mg/L. Based on recent guidance from the NSW EPA, JBS&G consider adoption of ANZG (2018) low reliability values of 0.0023 mg/L for arsenic in marine waters to be more appropriate. With consideration of the revised criterion, arsenic concentrations in all groundwater samples are noted to exceed the adopted criterion.

²⁵ Australia and New Zealand Guidelines for Fresh & Marine Water Quality 2018 (ANZG 2018)

As discussed in **Section 1**, site development activities are proposed to accommodate a childcare centre. As such, JBS&G compared the soil analytical data from AECOM (2019) against the more sensitive land use criteria – Residential A including childcare centres (pursuant to NEPC 2013). TRH >C₁₆–C₃₄ fractions in sample BH24_0.3 reported a concentration of 330 mg/kg, marginally exceeded the more sensitive ecological screening level (ESL) of 300 mg/kg for coarse soil. All other contaminants were reported within the residential/childcare land use criteria.

AECOM (2019) concluded that the presence of ACM fragments in BH24 below 1.3 m bgs did not preclude the site suitability for commercial/industrial land use under the existing development scenario.

2.6.6 Review of Land Contamination (JBS&G 2019a²⁶)

JBS&G (2019a) conducted a due diligence assessment of land contamination in December 2019. The letter comprised a desktop assessment including review of previous environmental reports (as made available at the site) and a review of publicly available historical and environmental information. The review identified a number of data gaps were that required further consideration to evaluate the potential for contamination and what implications the site contamination status has for the proposed acquisition and development of the site.

2.6.7 Due Diligence Assessment (JBS&G 2020c²⁷)

Based on the findings of previous investigations, JBS&G conducted a due diligence contamination assessment to address identified data gaps to evaluate the potential for contamination at the site.

The investigation comprised a review of site environmental information, a detailed site inspection and a program of sampling/analysis which included:

- Advancement of eight soil bore locations (BH25-BH30, MW6-MW7, **Figure 4**) and soil sampling and analysis targeting AECs and to provide broad site coverage;
- Field screening of excavated material for indicators of P/ASS and subsequent laboratory analysis to assess for P/ASS in underlying soils at the site;
- Conversion of two soil bores to groundwater monitoring wells (MW6 and MW7, **Figure 4**) and groundwater sampling and analysis of groundwater from the two new and five existing (MW1 to MW5, **Figure 4**) monitoring wells;
- Soil vapour screening from twenty-one sub-slab locations (VP01 to VP21, **Figure 4**) and sampling and analysis of soil vapour from nine of the locations; and
- Field screening for high ground gas (HGG) from seven dual-purpose groundwater monitoring wells fitted with gas well caps (two rounds of sampling) and from twenty-one sub-slab points.

Based on the implementation of the investigation, the following was reported:

- Sand and sandstone fill were reported overlying reworked organic rich sandy clays and natural grey alluvial silty sands at the majority of locations, consistent with previous investigations (AECOM 2019);
- Concentrations of copper at three locations (BH25, BH29 and MW07, **Figure 4**) in sub-grade blue metal road base, exceeding the adopted ecological criteria for the most sensitive land uses (HIL A, NEPC (2013));

²⁶ *Review of Land Contamination Information, Toyota Caringbah Rev 0.* JBS&G Australia Pty Ltd document reference 58037-126401, dated 16 December 2019 (JBS&G 2019a)

²⁷ *Toyota Caringbah Due Diligence Assessment.* JBS&G Australia Pty Ltd. Document reference 58037/127800 (Revision 1). Dated 25 February 2020 (JBS&G 2020c)

- P/ASS were identified within soils at depths of between 2-3 m bgs to the maximum depth of the investigation (6.8 m bgs);
- Concentrations of COPC in groundwater were generally reported below the adopted criteria with the exception of ammonia which was reported at three locations (MW3, MW4 and MW7, **Figure 4**), above the site-specific ecological criteria (ANZG 2018) for 95 % species protection for marine environments;
- Exceedances of the adopted site criteria in soil and groundwater were considered not to pose an unacceptable risk to ecological receptors at the site under the current or proposed land uses (pursuant to NEPC (2013));
- PFAS was considered not to be present at significant concentrations in site groundwater, nor at a level that would indicate the presence of gross or widespread contamination requiring further investigation, management or remediation.
- Soil vapour assessment reported concentrations of volatile COPC below the adopted site assessment criteria;
- Ground gas assessment identified the presence of potentially HGG underlying the site likely associated with the anerobic microbial decay of organic materials present within the sites underlying lithologies (both uncontrolled fill and/or naturally occurring material). The investigation identified;
 - Concentrations and low flow rates are considered generally consistent with concentrations and low gas generation rates to be expected in reclaimed coastal or estuarine swamps and mangrove flats (EPA 2020a²⁸);
 - Elevated carbon dioxide and methane were reported within the north eastern portion of the site at sub slab sample locations VP20, VP21 (**Figure 4**) and at ground gas monitoring well locations MW3 and MW4 (**Figure 4**), with a characteristic gas situation of CS2 ('low risk');
 - As methane was reported above 20% v/v as such, a CS value of 3 was applied to the northern portion of the site;
 - The balance of the site (south western) was reported to fall within a characteristic gas situation of CS1 ('very low risk'); and
 - A CS value of 3 requires a value for gas protection of 2 for land uses inclusive of large open plan warehouses and commercial buildings.

JBS&G (2020c) recommended further assessment of ground gases be undertaken (including continuous monitoring) to develop a detailed understanding of the nature and temporal variation in ground gases at the site through CSM development, and to better draw conclusions on the requirement for potential future management and/or implications to the redevelopment of the site.

Further, JBS&G (2020c) recommended additional investigation be conducted within vicinity of BH24 (AECOM 2019) to delineate and quantify bonded ACM impacted fill material in accordance with NEPC (2013) and Western Australia Department of Health (WA DOH 2018²⁹) guidance.

JBS&G (2020c) concluded management of P/ASS is required as part of future redevelopment works (i.e. piling and/or deep excavations) and a site-specific management plan (ASSMP) will be required to be developed.

²⁸ Contaminated Land Guidelines: Assessment and Management of Hazardous Ground Gases, NSW EPA, May 2020 (EPA 2020a)

²⁹ Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, WA Department of Health 2009, updated 2018 (WA DOH 2018).

2.6.8 Acid Sulfate Soil Management Plan (JBS&G 2020b)

JBS&G (2020b) prepared an ASSMP to document procedures to be implemented to manage the potential environmental risk associated with disturbance of P/ASS materials identified by JBS&G (2020c) and to provide a framework for ongoing management of P/ASS at the site. The management plan presented the following:

- Based on previous investigations, P/ASS materials are typically associated with natural/reworked natural estuarine silty clays and alluvial sands;
- Construction activities which have the potential to generate P/ASS include (but not limited to); building foundations, service installations, piling, dewatering, and/or general site excavations;
- The collection of additional environmental data prior to proposed excavations would facilitate the efficient and effective management of P/ASS at the site;
- The addition of neutralising chemicals is recommended as the preferred P/ASS treatment approach; and
- Existing data presents liming rates varying between 9 kg and 25 kg lime/tonne of PASS for appropriate treatment. Notwithstanding, the revising of liming rates will be required based on the placement (i.e. stockpiled) or extents (i.e. batters/exposed faces) of P/ASS materials.

2.6.9 Detailed Site Investigation (JBS&G 2020a)

JBS&G prepared a detailed site investigation (DSI) report for the site. The scope of works included a review of previous investigations and a targeted program of soil and ground gas sampling/monitoring and analysis as follows:

- Additional soil sampling and analysis via advancements of twelve 200 mm boreholes (BH24A to BH24L, **Figure 4**) in proximity to an area of previously identified asbestos impact (BH24). Field quantification was conducted in accordance with WA DOH (2018). Bonded ACM fragments were identified at one sample location (BH24C), in addition to BH24, in a 10L field quantification sample, with a reported concentration of 0.057 % w/w, in exceedance of the adopted site criterion for the most sensitive land use (HIL-A, NEPC (2013)) and less sensitive commercial/industrial land use (0.05% w/w (HIL-D, NEPC (2013))).
- Installation and monitoring of two ground gas wells (LGF01 and LGF02, **Figure 4**) for a period of 23 days, including continuous monitoring. Elevated levels of methane, carbon dioxide and low flows of ground gases were reported as part of the current assessment. Through a detailed assessment of the gas concentrations, flow rates and the conceptual site model, the site was reported to pose a 'very low risk' (when considered with relevant NSW EPA endorsed guidelines) and a characteristic gas situation of '1' was reported as generally applicable to the site.

Based on the scope of the work completed the following conclusions and recommendations were made.

- The soil, groundwater and soil vapour investigations did not identify gross or widespread contamination at concentrations that would preclude the use of the site for its proposed mixed uses (commercial retail spaces, industrial warehouses and a childcare centre).
- Isolated copper and TRH concentrations exceeding the adopted ecological criteria in soil were not considered to represent an unacceptable risk to current/future site receptors under the current/proposed development scenarios.

- Heavy metal and ammonia in groundwater were reported to exceed the adopted ecological criteria. Heavy metals were considered reflective of background concentrations to be expected in urban environments and considered not to pose an unacceptable risk at the site. Ammonia was considered to be present in groundwater as a result of the anerobic decay of organic rich sediment underlying the site and in the absence of nitrate/nitrite was not considered to pose an unacceptable risk to current/future ecological receptors under the current/proposed land uses.
- The asbestos impact at the east of the site (BH24 and BH24C, **Figure 5**) was confirmed to be bonded in nature and was restricted/isolated to an area of approximately 505 m² by 2.4 m in depth requiring remediation/management (approximately 1,200 m³).
- P/ASS has been identified in underlying soils at the site and will be required to be managed in accordance with the ASSMP (JBS&G 2020b).
- Indoor ambient air assessment did not identify the presence of HGG within existing site structures.
- Based on the gas risk assessment and detailed CSM, giving appropriate consideration to the gas screening value (GSV) and CSM as part of the multiple lines of evidence approach, a 'very low risk' characteristic situation CS1 was considered the most appropriate for the site, and where current/future development of the site includes/will involve engineered concrete slabs associated with the built form, mitigating potential ground gas migration.
- With consideration to requirements of the UPSS Regulation and the NSW EPA's preference that abandoned USTs be removed, JBS&G recommends that the UST/s are appropriately decommissioned (removed), and the resulting excavation/s validated.
- JBS&G recommend a RAP be prepared to describe the required management strategy including any necessary remediation and validation works to ensure the site is suitable for the proposed mixed uses (commercial retail spaces, industrial warehouses and a childcare centre).

3. Conceptual Site Model

A conceptual site model has been presented following as:

- The extent of contamination;
- Potential fate and transport of contaminants;
- Potential receptors to site contamination; and
- Potentially complete exposure pathways.

This is detailed in the following sections.

3.1 Extent of Contamination

A range of previous assessments have been completed on the site as detailed in **Section 2.6**. On the basis of these investigations, the following contamination issues have been identified on the site:

- Asbestos impacted soils have been identified as present in fill materials to a depth of 2.4 m adjoining the central part of the site's eastern boundary. Asbestos has been identified as occurring as fibre cement sheet debris (i.e. bonded asbestos) as mixed with soil;
- An historically abandoned UPSS is located adjoining the central part of the site's north-western boundary. In lieu of an assessment confirming otherwise, it is assumed that there is potentially localised petroleum hydrocarbon impact present in fill/soil in close proximity of this infrastructure; and
- Estuarine silty clays and alluvial silty sands as observed occurring underlying fill materials (at 2 to 3 m bgs) have been identified as consisting of P/ASS.

Levels of soil, soil vapour/gas (excluding those around UPSS infrastructure) and groundwater constituents otherwise have not been reported at a level that will pose a potential health or ecological risk. The locations of the asbestos impacted soils and the location of the former site UPSS is shown on **Figure 5**.

3.2 Potential Fate and Transport of Contaminants

Contaminants generally migrate from a site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants identified as part of the site history review and previous investigation are generally in either a solid form (e.g. asbestos) or liquid form (e.g. hydrocarbons, acid leachates from ASS, oxidation of PASS).

As the site is covered by a combination of concrete/asphaltic pavement and vegetation (landscaped garden beds with minor areas of grass cover), the potential for windblown dust migration of contamination from the site is generally low. The potential for contamination migration via surface water movement and infiltration of water and subsequent migration through the soil profile is further considered generally to be low noting impermeable pavements and the physical forms of contaminants identified.

Potential acidic leachates from P/ASS will not occur in lieu of the disturbance of these materials. Where these materials are disturbed and liquid leachates are caused to migrate from the soils, then they can migrate as surface water/overland flows, or otherwise through infiltration through groundwater and via groundwater flows. The acidic nature of these leachates can alter the oxidation states of otherwise naturally occurring heavy metals as present in soils, causing reduction and occurrence as dissolved forms. This can also lead to elevated levels of some heavy metals migrating as dissolved forms in the leachate.

Where petroleum hydrocarbon impacted soils are still present in the proximity of the abandoned UPSS, there is a potential for petroleum vapours to be present. Petroleum hydrocarbon vapours may pose a potential risk by intrusion to structures and accumulation within.

3.3 Potential Receptors

Potential human populations who may be exposed to site impacts in the future (if they are not remediated or appropriate management is not implemented prior to or during development) include:

- Current and future site occupants/workers/visitors who may potentially be exposed to contaminants of concern through direct contact with impacted soils, groundwater and/or inhalation of dusts/fibres/vapours associated with impacted soils; and/or
- Excavation/construction/maintenance workers conducting activities at the site, who may potentially be exposed to contaminants of concern through direct contact with impacted soils and groundwater present within excavations and/or inhalation of dusts/fibres/vapours associated with impacted soil.

Potential ecological receptors identified on and in proximity of the site include flora species established on the site; and downgradient ecological receptors including the marine waters of Woollooware Bay.

3.4 Potential Exposure Pathways

Based on the contaminants of concern identified in various media as discussed above, the potential exposure pathways for the site include:

- Potential dermal and oral contact to impacted soils and groundwater as present at shallow depths and/or accessible by future service excavations at isolated locations associated with asbestos impact and/or UPSS infrastructure;
- Inhalation of potential COPC including asbestos and/or vapours migrating upwards UPSS infrastructure; and
- Potential contaminant uptake by vegetation within landscaped areas.

3.5 Preferential Pathways

For the purpose of this assessment, preferential pathways have been identified as natural and/or man-made pathways that result in the preferential migration of COPC as either liquids or gases.

Man-made preferential pathways are present throughout the assessment area, generally associated with fill materials, and at near surface depths over the remainder of the assessment area. Fill materials are anticipated to have a high permeability.

Sub-surface services are also present, or will be present as part of site redevelopment, throughout the assessment area. Preferential pathways can be created by the generally higher permeability backfill used to re-instate these trenches.

Preferential pathways are also important in the assessment of potential off-site sources of COPC. Preferential pathways are potentially present in the adjoining road network, as associated with service easements.

4. Remedial Options

4.1 Remedial Goal

The goal for the remediation and/or management of environmental impact is to remove unacceptable risks to human populations who will potentially use the multi-use redeveloped site in the future; and to undertake remedial works in a manner that best complies with the principles of ecologically sustainable development (ESD).

4.2 Extent of Remediation

Remediation is required to address the following areas of site contamination:

- Two isolated locations of asbestos impacted soil as present adjoining the central part of the site's eastern boundary, as shown on **Figure 5**; and
- Presence of abandoned UPSS (and associated surrounding fill/soil) adjoining the north-western boundary.

It is noted that P/ASS have also been identified as a potential environmental issue on the site. However, the management of these materials will be undertaken through the JBS&G (2020b) ASSMP.

4.3 Assessment of Remedial Options

The approach adopted in this RAP is consistent with the preferred hierarchy of options for site clean-up and/or management provided in NEPC (2013), which are listed as follows:

- on-site treatment so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
- off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or

if the above are not practicable,

- consolidation and isolation of the soil on-site by containment within a properly designed barrier; and
- removal of contaminated soil to an approved site or facility, followed where necessary, by replacement with appropriate material;

or

- where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

In addition, it is also a requirement that remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the site undisturbed. And, where there are large quantities of soil with low levels of contamination, alternative strategies are required to be considered or developed (EPA 2017³⁰).

Remedial options have been assessed for the site as detailed in **Table 4.1** following. Remedial options have been considered specific to each of the two site contamination issues identified as requiring to be addressed by this RAP.

³⁰ Contaminated land Management – Guidelines for the NSW Site Auditor Scheme (3rd Edition). NSW EPA 2017 (EPA 2017)

Table 4.1: Assessment of Remedial Options

Remedial Option	Applicability	Assessment
1. On-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level.	<p><u>Hydrocarbons (petroleum)</u></p> <p>Given that soil contaminants associated with petroleum storage consist of hydrocarbon constituents, there is a potential that they may be able to be remediated on site by a bioremediation style remediation method. Bioremediation occurs where contaminants are chemically broken-down by the metabolic processes of micro-organisms into less toxic or non-toxic forms. NSW EPA guidance requires bioremediation methods to demonstrate that pollutant emissions are not discharged to the atmosphere.</p> <p>On this basis, the lateral extent of the bioremediation activity requires to be restricted to ensure that air emissions from remediation materials are able to be collected.</p>	<p><u>Hydrocarbons (petroleum)</u></p> <p>Potential option</p> <p>Given the volume of material, restricted space and time it may take to remediate fill/soils to a level that they do not represent an unacceptable risk and/or contribute to groundwater impacts, this method is not practicable but is feasible.</p>
	<p><u>ACM</u></p> <p>Hand picking of ACM within fill material is labour intensive, however, it is more in keeping with the principals of ESD, reducing the need to dispose of material to landfill and import material to reinstate excavations. Should the material be particularly high in ACM content, or prove difficult to achieve validation, consideration should be given to off-site disposal.</p>	<p><u>ACM</u></p> <p>A suitable option as this reduces material requiring disposal to landfill, the resources that would be required to remediate the material are minor and is considered consistent with ESD objectives for the project.</p>
2. Off-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level, after which the soil is returned to the site.	<p><u>Hydrocarbons (petroleum)</u></p> <p>As above (Option 1), however, additional time, energy and costs are incurred to take soils off site and return them to the site, in addition to there being no/limited currently licensed facilities in close proximity of the site to undertake soil treatment.</p>	<p><u>Hydrocarbons (petroleum)</u></p> <p>Not a suitable option.</p> <p>Energy/resource use associated with the transport and return of materials is not considered consistent with ESD objectives for the project.</p>
	<p><u>ACM</u></p> <p>As per Option 1, however, there are reductions in noise and dust emissions on site in comparison to on-site treatment, but these are offset by increased truck movements and the potential for exposure to emissions over a wider area. It is also noted that there are licensing issues, associated costs and limited licensed off-site treatment facilities in the surrounding area</p>	<p><u>ACM</u></p> <p>Not a suitable option given the volume of material, the resources that would be required to remediate the material and available facilities.</p>
3. On-site in situ management of the soil by physical separation	<p><u>Hydrocarbons (petroleum)</u></p> <p><u>Although a feasible option, not the preferred option given the low potential volume of impacted material and logistics of retaining fill within the current development (i.e. excavation and relocation).</u></p> <p><u>ACM</u></p> <p>A feasible option which is being considered for Stage 1 development activities where impacted materials are not proposed to be disturbed under the development scenario and suitable capping arrangements already exist to preclude direct contact.</p>	<p><u>Hydrocarbons (petroleum)</u></p> <p>Not the preferred option.</p> <p><u>ACM</u></p> <p>The preferred option given the material is currently capped by hardstand pavement precluding access to site users.</p>
4. Excavation and off-site removal of	<u>Hydrocarbons (petroleum) and ACM</u>	<u>Hydrocarbons (petroleum)</u>

Remedial Option	Applicability	Assessment
the impacted material.	There are currently suitably licensed waste facilities in the Sydney Metropolitan region capable of accepting the identified contaminants within fill materials. These are generally located a significant distance from the site.	The preferred option given that the material is likely to be impacted with lead which is not easily remediated. <u>ACM</u> Not the preferred option on the basis the material can remain below hardstand for the current development stage..

4.4 Preferred Remedial Approach

Based on the assessment in **Table 4.1**, the preferred remedial approach is:

- On-site retention of bonded ACM above the health criterion under a cap/cover remediation strategy subject to ongoing management is the preferred option for Stage 1 development activities; and
- Removal and disposal of former UPSS infrastructure and any residual petroleum hydrocarbon impacted soils that do not meet land use criteria (if identified).

5. Remedial Plan

5.1 Regulatory and Planning Requirements

This RAP has been prepared with reference to the following guidelines and legislation.

5.1.1 Environment Planning and Assessment Act 1979/SEPP 55

The proposed remedial works discussed herein are considered to be Category 1 remediation work as defined in SEPP 55, due to several planning instruments (Urbis 2019³¹) that apply to the land, and will require specific development consent under the *Environmental Planning and Assessment Act 1997*.

It is understood the remediation works are proposed to be undertaken ancillary to other development that requires consent.

5.1.2 Environment Planning and Assessment Regulation 2000 – Schedule 3 Designated Development

The proposed remediation works are not proposed to involve onsite treatment of soil (refer to **Table 4.1**) and not require specific development consent.

5.1.3 Protection of the Environment Operations Act 1997

The proposed remediation/validation activities are not required to be licensed under the *Protection of the Environment Operation Act 1997*.

5.1.4 Water Management Act 2000

Dewatering is not anticipated for remedial works.

Should groundwater dewatering be required, a dewatering licence will be obtained from the NSW Department of Primary Industry – Water (DPI). The approval will require to be obtained prior to the undertaking of any groundwater dewatering and treatment.

If rainwater accumulates at the site and requires removal from the site, any discharge is required to be in accordance with the *POEA Act*.

If any water is required to be discharged from site to sewer as part of the remedial works scope, approval from the asset owner (Sydney Water) will be required. Sydney Water's approval conditions will require to be upheld by the Principal/Remediation Contractor and demonstration thereof included as part of the validation report.

5.1.5 Protection of the Environment Operations (Waste) Regulation 2014

The regulations make requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site will not require to be licensed. Section 48 of the Regulation requires that wastes are stored in an environmentally safe manner. It is also stipulated that vehicles used to transport waste must be appropriately licensed and covered when loaded with impacted materials. For transport activities this regulation also details additional tracking requirements for vehicles carrying Special (asbestos) waste if material is identified to contain asbestos following waste classification activities.

Provision is provided in the Regulation and EPA (2014) guidelines for the NSW EPA to approve the immobilisation of contaminants in waste (if required with unexpected finds).

³¹ Toyota Woollooware Bay Planning Report. Urbis Pty Ltd, dated May 2019 (Urbis 2019)

5.1.6 Waste Classification Guidelines

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with EPA (2014). Where wastes require immobilisation prior to off-site disposal (to reduce waste classifications) an immobilisation approval shall be sought in accordance with Part 2 of the guideline. Immobilisation is not anticipated.

Should treated P/ASS require off-site disposal then this is required to be undertaken in accordance with the ASSMP (JBS&G 2020b) prepared for the site.

5.1.7 Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019

The removal of UPSS including UST(s) will be undertaken in accordance with SafeWork NSW requirements and a validation report will be provided in accordance with the provisions of the POEO (UPSS) Regulation. The validation process in this RAP meets the requirements of the regulation.

5.1.8 Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017

The information and data provided in this RAP should be considered by the Principal/Remediation Contractor in preparation of their health and safety plans for the remedial works (refer to **Section 8.2**).

Asbestos Removal and Management

The removal and disposal of asbestos will be managed in accordance with the *Work Health and Safety Act* (2011) and *Work Health and Safety Regulation* (2017) and relevant Australian standards, regulations and codes of practice.

A licensed asbestos removalist and SafeWork notification regarding the scope of the removal works is required. It will be the requirement of the appointed Principal/Remediation Contractor to obtain the appropriate approvals and prepare an asbestos management plan (AMP).

5.1.9 Sutherland Shire Council Development Control Plan

The site is subject to development controls as specified in the Sutherland Shire Development Control Plan (DCP). Stockpiling, materials tracking, materials control procedures have been incorporated into this RAP.

5.2 Site Establishment

The extent of remediation is summarised in **Section 4.2** and shown on **Figure 5**. The Principal/Remediation Contractor shall secure the site to ensure that all safety and environmental controls are implemented. These controls will include, but not be limited to:

- Locate and isolate all required utilities in the proximity of the works;
- Assess need for and implement of any necessary traffic controls;
- Work area security fencing;
- Site signage and contact numbers;
- Stabilised site entry gate;
- Appropriate decontamination areas for personnel and plant, if required;
- Sediment fencing (attached to security fencing); and
- Stormwater runoff and sediment controls (e.g. silt fences and hay bales).

5.3 Remedial Works

The remedial works are required to be undertaken by the Principal/Remediation Contractor with appropriately qualifications, licenses and experience, under the supervision of JBS&G.

5.3.1 Removal of Petroleum Infrastructure

The UPSS infrastructure (refer to **Figure 5**) is required to be removed, inclusive of the following anticipated infrastructure:

- USTs;
- Remote fill points;
- Vent points and associated venting lines;
- Bunding (i.e. concrete bunding);
- Fuel dispensers (bowsers);
- Fuel pipework;
- Any liquid waste; and
- Tank anchors.

All removal works are required to be undertaken in accordance with relevant Australian standards, regulations and codes of practice including Section 4 of Australian Standard (AS) 4976: *The removal and disposal of underground petroleum storage tanks* (AS 2008b), and AS 1940: *Storage and handling of flammable and combustible liquids* (AS 2004b).

Bedding sand and associated impacted fill/soil will also be removed and stockpiled as necessary for characterisation pending off-site disposal (where necessary). Remedial excavation validation samples will be subsequently collected by JBS&G field staff for field screening and laboratory analysis in accordance with the methodology and densities outlined in **Section 6.1.7**.

Stockpiling shall be undertaken to restrict potential environmental emissions in accordance with the requirements of the Remediation Environmental Management Plan (REMP) as discussed in **Section 8**. Hydrocarbon impacted soils, including the bedding sand, as may be identified in conjunction with the infrastructure removal work are required to be remediated. Remedial options, following collection of analytical data are likely to include off-site disposal to a facility lawfully able to accept the material. Should the material be identified as not be impact, the material may be the subject of a beneficial reuse evaluation.

Validation of the removal works and associated remediation of impacted material shall be undertaken in accordance with Section 6 of this RAP and reference to EPA (2020) *Guidelines for implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019* and the requirements of NEPC (2013). In addition, detailed notes and documentation (including photographs and description of tank contents) will be made during removal of the petroleum infrastructure.

5.3.2 Excavation of Petroleum Hydrocarbon Impacted Soil

Fill/soils in the vicinity of the identified UPSS are inferred to be a potential source of petroleum hydrocarbon impacts, as discussed above. As such, fill/soils within these portions of the site are required to be excavated and separated from the balance of the site fill/natural soils.

Fill/natural soils will be removed to the extent practicable with consideration of boundary conditions/structural stability issues and place on a hardstand (or hard plastic) to limit cross contamination or migration of contaminants.

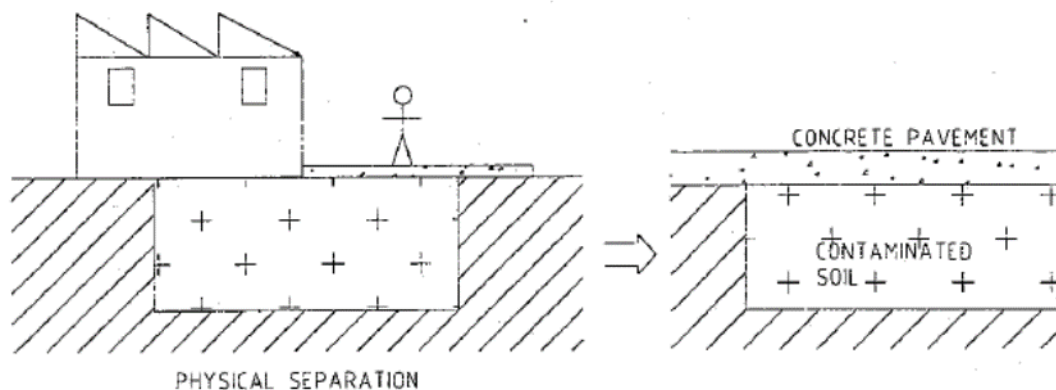
Impacted material will be identified visually, from olfactory detection, and through the use of a PID and will be chased out under the direction/supervision of one of JBS&G's qualified and experienced scientists/engineers. Excavated fill materials will be temporarily stockpiled. Stockpiling shall be undertaken to restrict potential environmental emissions in accordance with the requirements of REMP as discussed in **Section 8**.

Hydrocarbon impacted material deemed unsuitable for on-site retention based on validation assessment results will be remediated via removal from the site to a facility lawfully able to accept the material. All materials requiring off-site disposal are required to be classified in accordance with EPA (2014) Waste Classification Guidelines.

Remedial excavation validation samples will be subsequently collected by JBS&G field staff for field screening and laboratory analysis in accordance with the methodology and densities outlined in **Section 6**.

5.3.3 Containment of Impacted Fill

A conceptual sketch, sourced from ANZECC 1999³², is shown following:



ANZECC (1999) notes no soil cover is acceptable where cover is provided by hardstand floor slab or pavement. Asbestos impacted fill is proposed to be managed via containment under existing hardstand capping arrangements (physical separation), which minimise disturbance of asbestos in soil impacts and eliminates the inhalation exposure pathway for airborne asbestos fibres. It is noted the current asbestos impact at the site has been identified at two isolated locations in the eastern car park area (below asphalt pavement) at a depth of approximately 0.3 m below current site levels to a depth of approximately 2.4 m bgs. As part of Stage 1 development activities the impacted material is proposed to be retained *in-situ*. Remediation of the site will include documenting physical separation arrangements in place under the current site configuration to ensure they meet the minimum requirements for containment, specifically, the presence of impenetrable hardstand pavement in a condition sufficient to preclude direct access to subsurface soil.

Proper management controls such as an Asbestos Management Plan (AMP) and Environmental Management Plan (EMP), inclusive of details as to the extent of impacted fill and existing capping arrangements, and a Ground Disturbance Procedure which minimises the risk of containment failure will be required for retained *in-situ* asbestos impacts at the site.

³² Guidelines for the Assessment of On-site Containment of Contaminated Soil, Australian and New Zealand Environment and Conservation Council, September 1999. (ANZECC 1999).

5.4 Asbestos Air Monitoring

During any asbestos-related remedial works, perimeter air monitoring will be conducted on each of the site boundaries and/or around the remedial works perimeter. Additional downwind monitoring locations will be included in the air monitoring program as required.

Air monitoring will be conducted in accordance with the requirements of the National Occupational Health and Safety Commission (NOHSC) Asbestos Code of Practice and Guidance Notes, in particular the Guidance note for the estimation of airborne asbestos dust [NOHSC 3002:2005] as detailed in **Section 8**.

5.5 Off-site Disposal

Where waste is required to be removed, waste materials shall be classified in accordance with EPA (2014) *Waste Classification Guidelines* or an appropriate exemption as created under the *Protection of the Environment Operations (Waste) Regulation 2014*.

The waste facility must be lawfully licensed to receive the material sent to it for disposal.

The Principal/Remediation Contractor must be aware of and conduct all waste disposal in accordance with all relevant regulations. All waste tracking documentation including disposal dockets must be maintained by the Principal/Remediation Contractor and must be provided to JBS&G/the client for inclusion in the validation report.

Where P/ASS is encountered, consideration should also be given to JBS&G (2020b) and the waste treatment and disposal requirements.

5.6 Materials Importation

A requirement to import material is unlikely. It is envisaged soil piling spoil or similar will be used to reinstate remedial excavations

If material is to be imported to the site, e.g. for the reinstatement of excavations, then it shall be validated as per **Section 6.1.7**.

5.7 Surveying

A qualified surveyor will conduct surveying of excavations, stockpiles and remedial extents (as required for volume reconciliation).

5.8 Validation

Validation of the remedial works will be conducted by JBS&G to demonstrate that the remediation objectives have been achieved. Details of the validation program are provided in **Section 6**.

5.9 Site Disestablishment

On completion of the remediation works all plant/equipment and safety/environmental controls shall be removed from the site by the appointed Principal/Remediation Contractor. All equipment used during remediation works will need to be appropriately decontaminated or disposed of as waste in accordance with relevant waste regulations.

6. Validation Plan

6.1 Overview

Validation data is required to be collected to verify the effectiveness of the remedial works and document the final site conditions as being suitable for the proposed future use(s).

The following sections establish the data quality objectives (DQOs) to be adopted during validation of the site remediation works.

6.1.1 State the Problem

The site, which has historically been used for commercial/industrial land uses is proposed to be redeveloped for mixed uses (refer to **Section 1**). Past assessment activities, as summarised in **Section 2** have identified that, prior to redevelopment, remediation of contamination is required. Stage 1 development activities under DA21/0777 will include the removal of UPSS and associated hydrocarbon impacted soils (if identified), and the ongoing *in-situ* management of asbestos impacted soil.

During remediation activities, sufficient validation of the site activities is required to demonstrate that the identified environmental and health-based risks to future site user(s) have been adequately managed to render the site suitable for the proposed land use/development.

6.1.2 Identify the Decision

The decisions which are required to be made for validation of the site are:

- Has all petroleum infrastructure been successfully removed from the site?
- Has all petroleum impacted fill/soil in the vicinity of the petroleum infrastructure deemed unsuitable for onsite retention been successfully removed from the site to the extent practicable?
- Has ACM impacted fill been managed such that it does not pose a direct contact risk to future site users?
- Are imported soils (where required) environmentally suitable for their proposed use?
- Is the site suitable for the proposed use?

6.1.3 Identify Inputs to the Decision?

Inputs to the decisions are:

- Field observations in relation to inspection of all excavation bases, walls and stockpiles for odours, sheen, discolouration, and other indicators of potential contamination.
- Soil validation analysis data collected from stockpiles/treated material and the base and walls of remedial excavations.
- Waste classification and/or material characterisation data obtained during assessment of fill materials/soils.
- Materials tracking records.
- Importation assessment criteria.
- Survey data.
- Management plan documentation (where required).

- Disposal dockets and relevant documents in relation to appropriate disposal of material to be removed from site as part of the remediation works (landfill dockets, beneficial reuse/recycling dockets).
- Data quality indicators as assessed by quality assurance/quality control (QA/QC).

Specifically, sufficient data needs to be collected from each of the identified potentially impacted media (e.g. fill material and natural soils) across the site for associated COPC.

6.1.4 Define the Study Boundaries

The site boundaries are defined in **Section 2.1** and presented on **Figures 1** and **2**. The surrounding land uses are outlined in **Section 2.3**. The vertical extent of the works will be the maximum depth of remedial excavations (anticipated to be 2 m associated with UPSS infrastructure).

Validation works will be completed within development timelines to be informed by Aliro.

6.1.5 Develop a Decision Rule

Decision rules are provided following for each of the decisions:

- Has all petroleum infrastructure been successfully removed from site?
 - If all UPSS infrastructure has been removed from the site in accordance with EPA made or endorsed guidelines and the material removed from site to a facility lawfully able to accept the waste, then the decision will be Yes. Otherwise the decision will be No and additional assessment and/or remediation will be required to demonstrate the objectives of the RAP have been achieved.
- Has all petroleum impacted fill/soil in the vicinity of the UPSS infrastructure that is deemed unsuitable for onsite retention, been successfully removed from the site to the extent practicable?
 - If assessment of field observations and analytical results with site validation criteria indicates remedial works have effectively resulted in the removal of the petroleum hydrocarbon impacted fill/soil, then the decision will be Yes. Otherwise the decision will be No, and additional assessment and/or remediation will be required to demonstrate the objectives of the RAP have been achieved.
- Has ACM impacted fill been managed such that it does not pose a direct contact risk to future site users?
 - Has the capping arrangement been documented where ACM impacted fill remains to demonstrate ACM impacts do not pose a potential dermal or oral risk to site users, such that the site can be considered suitable for the proposed uses subject to an Environmental Management Plan (EMP), if so the answer to the decision question is Yes. Otherwise, the decision will be No, and additional assessment and/or remediation/management will be required to demonstrate the objectives of the RAP have been achieved.
- Are imported soils (where required) suitable for their proposed use?
 - If imported soils are comprised of virgin excavated natural material (VENM) or excavated natural material (ENM) and they are used in accordance with the relevant exemptions, and analyte levels within the soils meet all the adopted validation criteria (**Section 6.3**) then the decision will be Yes. Otherwise the decision will be No.
- Have the objectives of the RAP been achieved such that the site upon completion of remedial works is considered appropriate/suitable for permissible land uses?

- If all answers to the above decisions are Yes, then the site is suitable for the proposed use. Otherwise the decision is No, and additional assessment and/or remediation is required to demonstrate the objectives of the RAP have been achieved.

6.1.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (2013), ANZG (2018), appropriate indicators of data quality (DQIs used to assess QA/QC) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined DQIs for completeness, comparability, representativeness, precision and accuracy.

The pre-determined Data Quality Indicators (DQIs) established for the project are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters), and are shown in **Table 6.1**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** – expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted criteria.

If any of the DQIs are not met, further assessment of the data set will be required in order to determine whether the non-conformance has significant effects on the usefulness of the data. Corrective action to correct an adverse impact on the reliability of the dataset may include, but is not limited to, the request of further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

Table 6.1: Summary of Quality Assurance/Quality Control Program

Data Quality Objectives	Frequency	Data Quality Indicator
Precision		
Blind duplicates (intra laboratory) ²	1 / 20 samples	<30% RPD ² , asbestos in agreement
Blind duplicates (inter laboratory) ²	1 / 20 samples	<30% RPD ² , asbestos in agreement
Laboratory duplicates	1 / 20 samples	<30% RPD ² , asbestos in agreement
Accuracy		
Surrogate spikes	All organic samples	70-130%
Laboratory control samples	1 per lab batch	70-130%
Matrix spikes	1 per lab batch	70-130%
Representativeness		
Sampling appropriate for media and analytes		.. ³
Samples extracted and analysed within holding times.	-	Soil: organics (14 days), inorganics (6 months) Groundwater: metals (6 months, other than mercury - 28 days), sVOCs (>C ₁₀ - 7 days), volatiles (<C ₁₀ - 14 days) Soil vapour: sorbent tubes VOCs/TRH (28 days)
Trip spike (soil and ground water only) ¹	1 per sampling event	70-130% recovery
Storage blank (soil and groundwater only) ¹	1 per sampling event	<LOR
Rinsate blank (soil and groundwater only) ¹	1 per sampling data where reusable equipment is used	<LOR
Method blank (soil vapour only) ¹	1 per lab batch	<LOR
Equipment blank (soil vapour only) ¹	1 per lab batch	<LOR
Laboratory blanks	1 per lab batch	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All samples ¹
Standard analytical methods used for all analyses	All Samples	All samples ¹
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples ¹
Limits of reporting appropriate and consistent	All Samples	All samples ¹
Completeness		
Sample description and COCs completed and appropriate	All Samples	All samples ²
Appropriate documentation	All Samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	.. ¹
Data from critical samples is considered valid	-	Critical samples valid ³
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All Samples	All samples

¹ If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgment will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

² A qualitative assessment of compliance with standard procedures and appropriate sample collection methods will be completed during the DQI compliance assessment.

6.1.7 Optimise the Design for Obtaining Data

The purpose of this step is to identify a resource-effective field validation sampling design that generates data that are expected to satisfy the decision performance criteria, as specified in the preceding steps of the DQO process. The output of this step is the sampling design that will guide development of the field sampling and analysis plan. This step provides a general description of the activities necessary to generate and select data collection designs that satisfy decision performance criteria.

The remediation validation and subsequent laboratory analysis program as outlined in the following sections will need to be implemented during site remediation activities to demonstrate the successful completion of works in compliance with the RAP goals. The validation/characterisation sampling and analytical program for the site is outlined in **Table 6.2** below.

Table 6.2: Characterisation/Remediation Validation Program

Item	RAP Sampling Frequency		Analytical Suite
Export of Materials			
Classified in accordance with EPA (2014) Waste Guidelines	Soils requiring additional classification for off-site disposal will be sampled by JBS&G as per the sampling density for stockpiled materials in NEPC (2013)		TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (absent/present)
Validation of Petroleum Infrastructure Removal			
	Excavation Floors	Excavation Walls	
UPSS excavation	1 sample per 25 m ² , with a minimum of one sample per former UST location	5 m of excavation wall, with a minimum of 1 sample per wall	TRH/BTEX PAH VOCs Phenols Lead
Discrete sample locations under other petroleum infrastructure (i.e. remote fill points, fuel dispensers). In the event that significant impacted soil volumes are removed from these areas, the adopted sampling frequency for excavation bases and walls following UST removal will be adopted; and sample locations at a linear spacing of 5m underlying pipelines. Analysis as above.			
Hydrocarbon Impacted Fill Remedial Excavation			
	Excavation Floors	Excavation Walls	
Hydrocarbon remedial excavation	1 sample per 25 m ² , with a minimum of 1 sample per excavation	5 m of excavation wall, with a minimum of 1 sample per wall	TRH/BTEX PAH VOCs Phenols Lead
Materials Importation			
Imported VENM	Minimum of 5 samples per source site/material type up to 10,000 m ³ then 1 sample per 1000 m ³ thereafter		TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (NEPM protocol: 500 mL) plus source site inspection
Quarry VENM Materials (e.g. blue metal, sandstone, shale)	Confirmation that the material is quarried rock (VENM) prior to importation, and visual confirmation.		Source site inspection required
Recycle materials including 'quarry' products that are recycled.	Letter showing compliance with the EPL from the source facility and supplemented with analytical data at a density of 3 samples per material type/batch up to 2000 m ³ then one sample per 500 m ³ thereafter		TRH/BTEX PAH Heavy Metals Asbestos (NEPM protocol: 500 mL) plus a source site inspection
Imported ENM	As per the exemption		As per the exemption + asbestos (500 mL) plus a source site inspection
Unexpected Finds			
	Excavation Floors	Excavation Walls	
Unexpected Find	1 per 25 m ²	1 per 5 m lineal	As appropriate, depending on the location and characteristics of the unexpected find

The nominated sampling densities and analytical program have considered sample density guidance provided in EPA made and endorsed guidelines.

6.1.7.1 Documentation of the Physical Barrier (Capping)

In areas of proposed *in-situ* retention of bonded ACM impacted fill material, the physical separation arrangements shall be documented to sufficiently identify:

- The lateral extent of known environmentally impacted materials within the remediation area;
- The lateral extent and type of cover (e.g. permanent pavement, soil thickness) within the remediation area; and
- Confirmation, by photos or otherwise, of the physical separation arrangements including condition of hardstand pavements serving as the physical barrier.

6.2 Soil Sampling Methodology

6.2.1 Validation of Excavation(s)

Samples will need to be collected by an appropriately trained and experienced environmental scientist/engineer using a hand trowel or from the bucket of mechanical excavation equipment, at the required densities to meet the project DQOs.

Where appropriate, samples will be screened using a photoionization detector (PID) to assess the potential for volatile organics. Soil samples obtained for PID screening will be placed in a sealed plastic bag for approximately 5 minutes to equilibrate, prior to a PID being attached to the bag. Readings will then be monitored for a period of approximately 30 seconds or until values stabilise and the stabilise/highest reading will be recorded on the field sample forms.

The PID will be calibrated prior to the commencement of field works and then check readings will be completed on a daily basis during the field program using suitable calibration standards. If required, the PID will be re-calibrated during the field program in accordance with manufacturer's instructions.

Prior to collection of each sample, hand tools will need to be thoroughly decontaminated using phosphate free detergent and distilled water as per **Section 6.2.6**.

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indicators of contamination will need to be noted on the field documentation.

6.2.2 Stockpile Sampling

For stockpile sampling, material will be obtained from a minimum depth of 0.3 m into the surface of the stockpile at the time of sampling. Appropriate decontamination activities shall be followed following the collection of each sample.

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination will be noted on the field documentation.

6.2.3 Sample Handling

Collected samples will be immediately transferred to sample containers of appropriate composition (glass jars for chemical analysis, plastic bags for asbestos). Sample labels recorded: job number; sample identification number; and date of sampling.

Sample containers will be transferred to a chilled ice box for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form will be completed and forwarded with the samples to the testing laboratory.

6.2.4 Soil Duplicate and Triplicate Sample Preparation and QA/QC Requirements

Field duplicate and triplicate samples for the characterisation/validation assessment will be obtained during sampling using the procedures outlined at a frequency outlined in **Table 6.1**. The primary

sample will be divided laterally into three samples with minimal disturbance to reduce the potential for loss of volatiles and placed in three clean glass jars and / or plastic bags. All jars will be filled completely with no headspace to reduce the potential for loss of volatiles and separately labelled as the primary, duplicate and triplicate samples before being placed in the same chilled esky for laboratory transport.

Trip spike, storage blank and rinsate samples will be collected as per **Table 6.1**.

6.2.5 Soil Sampling Equipment Decontamination

The following procedure will be used to clean non-disposable equipment, including the trowel, pick etc., prior to the collection of each sample:

- Scrubbing with a wire brush to remove gross contamination;
- Pressure spray with Decon 90 detergent and potable water mix;
- Pressure spray rinse with potable water; and
- Air drying.

Rinsate samples will be obtained during the field decontamination procedures at regular intervals during characterisation/validation sampling activities. Each rinsate sample will be obtained by rinsing the trowel with laboratory grade demineralised water following the decontamination procedure. The water sample will be appropriately preserved and stored with the site samples prior to transport to the laboratory for chemical analysis.

6.2.6 Laboratory Analyses

Eurofins MGT Pty Ltd at Lane Cove, NSW will function as the primary laboratory for the required analyses. The secondary laboratory to be contracted for the works will be Envirolab Services Pty Ltd (Envirolab) at Chatswood, NSW. All laboratories are National Association of Testing Authorities (NATA) registered for the relevant analyses. In addition, the laboratories are required to meet JBS&G's internal QA/QC requirements.

6.3 Validation Criteria

Based on the proposed development details and in accordance with the decision process for assessment of urban redevelopment sites (EPA 2017), the most conservative land use criteria have been adopted, sourced from the following:

- Health based Investigation Levels (HILs) for residential (incl a childcare centre) with access to soils land use NEPC (2013) - HIL-A;
- Health Screening Levels (HSLs) for petroleum hydrocarbons considering potential for vapour intrusion, fine grained soil for low-high density residential (HSL A & B) land use at 0.0-1.0 m depth (NEPC 2013);
- Site specific ecological investigation levels (EILs) derived through the added contaminant limits for residential with minimal access to soils;
- Management Limits for TRH, fine grained soils for residential land use – NEPC (2013);
- Ecological Screening Levels (ESLs) for TRH fractions, BTEX and benzo(a)pyrene in fine grained soil for residential land use (NEPC 2013); and
- Where there are no NSW EPA endorsed thresholds the laboratory LOR has been adopted as an initial screening value for the purposes of this validation assessment.

It is noted, whilst there are NEPC (2013) HSLs that can allow for asbestos in soils at acceptable levels for given land use scenarios. For commercial sites having asbestos present, albeit meeting acceptable land use criteria, will still require an asbestos management plan (AMP) and register to

meet WHS Regulations. As such it is noted validation for the isolated known asbestos impact will attempt to achieve no visible ACM and friable asbestos (if encountered) is required to be below NEPC (2013) criterion such that it does not constitute an asbestos impacted environment under WHS Regulations.

6.3.1.1 Application of Soil Assessment Criteria

For soils to be considered as meeting the health/ecological based assessment criteria (i.e., not posing an unacceptable risk), the following criteria will be adopted:

Either:

- All contaminant concentrations were less than the adopted site assessment criteria,

Or:

- The upper 95% confidence limit on the average concentration for each analyte (calculated for samples collected from consistent soil horizons, stratigraphy or material types) was below the adopted criterion;
- No single analyte concentration exceeded 250% of the adopted criterion; and
- The standard deviation of the results was less than 50% of the criterion.
 - Analytical results for asbestos in soils will be directly compared to the site criteria. No statistical assessment for asbestos in soils will be undertaken.

In addition to the numerical criteria, the following visual observations will also supplement the assessment process:

- No visible asbestos containing material in addition to laboratory analysis results; and
- Consideration will be given to odorous or discoloured soils (caused by contamination).

6.3.2 Validation of Physical Barrier

For retained bonded ACM impacted fill material, validation of the capping arrangement will require to satisfy the requirements of **Section 5.3.3**. That is, validation of the presence of impenetrable hardstand pavement in a condition sufficient to preclude direct access to subsurface soil in areas of asbestos impacted fill.

6.3.3 Material Characterisation for Off-site Disposal

Where contaminated fill/soil is not suitable for on-site retention or is surplus to site requirements, materials are proposed to be remediated by off-site removal and disposal. Materials shall be classified in accordance with EPA (2014) *Waste Classification Guidelines* or an appropriate exemption as created under the *Protection of the Environment Operations (Waste) Regulation 2014*.

Material will require to be removed to a facility lawfully able to receive it.

Should treated P/ASS require off-site disposal then this is required to be undertaken in accordance with the ASSMP (JBS&G 2020b) prepared for the site.

6.3.4 Imported Materials

In accordance with current EPA policy, only material that does not represent an environmental or human health risk at the receiving site may be considered for resource recovery. Imported materials will only be accepted to the site if they meet the restrictions placed on these materials and meet the definition of:

- VENM as defined in the *Protection of the Environment Operations Act* (1997) Schedule 1;
- Excavated Natural Material (ENM) as defined in EPA (2014a); or

- Recycle materials as per an EPA exemption.

All material imported onto the site are required to be accompanied by appropriate documentation that has been verified by the appointed site contamination (environmental) consultant.

Sampling of materials as per an EPA exemption (recycled products) is required to be undertaken by the facility in accordance with the exemption. In addition, where materials are proposed for beneficial reuse under a NSW EPA exemption (i.e. imported to the site), fill material will need to be further assessed by JBS&G for land use suitability (refer to **Section 6.1.7**).

6.4 Reporting

6.4.1 Validation Report

The validation report shall be prepared by the environmental consultant written in general accordance with EPA reporting guidelines (EPA 2020b³³). The validation report will be submitted to the client at the completion of remedial works at the site.

The validation report should contain information including:

- Results of previous investigations conducted at the site;
- Details of the remediation works conducted;
- Information demonstrating that the objectives of the RAP have been achieved;
- Information demonstrating compliance with appropriate regulations and guidelines;
- All material tracking data;
- Any variations to the strategy undertaken during the implementation of the remedial works; and
- Details of any environmental incidents occurring during the remedial works and the actions undertaken in response to these incidents; and
- Other information as appropriate.

6.4.2 Environmental Management Plan

The proposed remediation of asbestos impacted soils as part of Stage 1 development activities will result in residual asbestos remaining at the site, asbestos management will be required for the ongoing operation of the site until such time as the material is removed and appropriate validation activities undertaken.

An EMP will be prepared by the Remediation Consultant to detail the ongoing management and monitoring requirements for the site, following the completion of the Validation Report for the site.

The EMP is required to document the following elements:

- A statement of the objectives of the EMP – i.e. to ensure continued suitability of the site following remediation;
- Identification of residual environmental contamination issues at the site that require ongoing management/monitoring to meet the SMP objectives, including the type of contamination (i.e., asbestos) and location within the site;
- Documentation of environmental management measures which have been implemented to address the identified environmental (asbestos) issues at the site;

³³ Consultants Reporting on Contaminated Land. Contaminated land Guideline. NSW EPA 2020 (EPA 2020b)

- Description of management controls to limit the exposure of site users to known areas of asbestos contamination;
- Description of responsibilities for implementing various elements of the provisions contained in the EMP;
- Timeframes for implementing the various control/monitoring, etc. elements outlined in the EMP;
- Environmental monitoring and reporting requirements (if required) for the future management of environmental impact underlying the site;
- Health and safety requirements for particular activities;
- Corrective action procedures to be implemented where EMP assessment criteria are breached.

7. Contingency Plan

A review of the proposed contamination-related aspects of the works associated with development of the site has been undertaken and has identified a number of potential risks, outlined in the following sections that required the development of contingencies to ensure that the objectives of this RAP are met.

The Contingency Plan is required to be part of the REMP, as described in **Section 8.1**, below, and part of the Work Health and Safety Plan (WHSP), as described in **Section 8.2**.

7.1 Unexpected Finds

The possibility exists for hazards that have not been identified to date to be present within fill materials or underlying pavements/building on the site. The nature of hazards which may be present, and which may be discovered at the site are generally detectable through visual or olfactory means, for example:

- Presence of visible non-friable ACM following removal of any hardstand or excavations; and/or
- The presence of significant aggregates of friable asbestos materials (visible) as opposed to minor occurrences of fragments or fibre bundles in soil; and/or
- Excessive quantities of Construction/Demolition Waste (visible); and/or
- Hydrocarbon impacted materials beyond that reported to date (visible/odorous); and/or
- Drums, waste pits (visible); and/or
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous); and/or
- Tarry like impacted soil/fill material (visible/odorous); and/or
- Potential chlorinated hydrocarbon impact (sweet odour soils).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be identified, the procedure summarised in **Flow Chart 7.1** is to be followed.

An enlarged version of the Unexpected Finds Protocol, suitable for use on the site, should be posted in the Site Office and referred to during the site-specific induction by the Principal Contractor.

The sampling strategy for each “unexpected find” shall be designed by a suitably qualified environmental consultant. The strategy will, however, be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The sampling frequency of the identified substance/materials shall meet the minimum requirements outlined in EPA (1995³⁴) in addition to those outlined in **Section 6**.

7.1.1 Identification of Additional Underground Storage Tanks

There is the potential that additional USTs may be encountered during demolition of the pavements or subsequent earthworks. In the event of such an occurrence, the Unexpected Finds Protocol (**Flow Chart 7.1**) will be implemented and remedial actions defined with consideration to the requirements for known USTs as documented in **Section 6**.

³⁴ Contaminated Sites Sampling Design Guidelines. NSW EPA 1995 (EPA 1995)

7.1.2 Identification of Asbestos Impacts in Unsealed Areas

Should asbestos impacts be identified in areas which are not covered by hardstand pavements (either in unsealed garden beds or as may be exposed following removal of hardstand pavements), the material will be required to be managed and a suitable capping arrangement (serving as a physical barrier) will be required to be installed/documentated. A marker layer will be required to be placed to delineate the lateral extent of impacted material (including prior to re-establishment of any hardstand pavements).

Where a marker layer is installed, it shall consist of a bright orange coloured non-woven polyester continuous filament or PET (such as nonwoven geotextiles) or similar with a minimum density of approximately 150 grams per square metre (or equivalent). The marker layer must:

- Be easily recognisable within soils (i.e., bright orange in colour);
- Be durable as a long-term marker layer (i.e., > 150 grams per square metre); and
- Maintain integrity during remedial/civil works such as capping layer insulation and road/building construction.

Additionally, the marker layer must meet geotechnical and civil specifications where required, i.e., underlying roads.

At least 0.5 m depth capping layer in vegetated areas is required for containment of asbestos impacted soils (ANZECC 1999). However, consideration of proper controls such as an Asbestos Management Plan or Site Management Plan (SMP), including a Ground Disturbance Procedure which minimises the risk of containment failure, may reduce the required thickness if necessary, in certain conditions. Deeper capping layers may be required in tree pit zones (if additional plantation of trees within the area is proposed) to accommodate for the increased root depths of trees, and to minimise potential containment failure during future landscaping works in these areas.

7.1.3 Identification of Oily or Tarry Materials

In the event that oily/tarry materials are encountered, the provisions outlined in the Unexpected Finds Protocol will be implemented, comprising inspection, testing and appropriate action as advised by the Field Scientist (**Section 7.1**).

Any suspected oily/tarry materials must be segregated from other excavated materials and placed in a designated area with appropriate odour and sediment controls until such time as appropriate assessment is completed and a methodology is confirmed for their appropriate management. In the event that the oily/tarry materials do not meet the site validation criteria, then they shall be stored in a secure area for later treatment or classified and removed from the site for treatment and/or disposal at an appropriately licensed facility.

7.1.4 Identification of Petroleum Hydrocarbon Impact

In the event that petroleum hydrocarbon impacted materials are encountered in areas where none are anticipated, the provisions outlined in the Unexpected Finds Protocol will be implemented, comprising inspection, testing and appropriate action as advised by the Field Scientist (**Section 7.1**).

Any suspected petroleum hydrocarbon impacted materials must be segregated from other excavated materials and placed in a designated area with appropriate odour and sediment controls until such time as appropriate assessment is completed and a methodology is confirmed for their appropriate management. In the event that the materials do not meet the site validation criteria, then they shall be stored in a secure area for later treatment or classified and removed from the site for treatment and/or disposal at an appropriately licensed facility.

7.1.5 Material Storage Breach

In the event that any materials storage containment controls are breached and stockpiled materials classified as asbestos contaminated soil or otherwise have escaped (or have the potential to escape), then the management controls shall be rectified and investigations undertaken to review the adequacy of the controls and any improvements implemented. The REMP (**Section 8**) shall include a documented process for identifying and responding to such incidents.

7.1.6 Emissions Complaints

Due to the nature of the activities and type of contaminants identified within the site, there is a potential for complaints to be received from members of the public and/or occupants of surrounding properties relating to environmental emissions including:

- Odour emissions arising from handling of malodorous soil;
- Noise and vibration arising from excavation, piling and other works;
- Dust emissions arising from excavation, material handling and placement; and
- Visibly impacted water quality in surface water discharge from the site.

Monitoring of all environmental emissions shall be undertaken during the works as detailed in the REMP (discussed in **Section 8**) and appropriate actions taken to further control emissions following receipt of a complaint. The REMP shall contain provision for contingency actions where excessive emissions occur, however it is anticipated that one or more of the following actions will be considered:

- Increased application of odour screening/masking chemicals on odorous materials;
- Disturbance of soils during meteorologically favourable periods only; and/or
- Covering of impacted soils.

7.2 Treatment or Disposal of Bonded ACM Impacted Fill

Should containment of asbestos impacted fill not be feasible, the excavation and treatment of bonded ACM impacted fill may be considered as an appropriate strategy. The Principal/Remediation Contractor shall undertake the following to remove ACM to acceptable levels:

- Fill identified to contain bonded ACM is to be progressively excavated and stockpiled in approximately 70 m³ batches,
- The lateral and vertical extent of the excavation and associated stockpiled soils are to be surveyed for material volume reconciliation;
- The bonded ACM impacted fill is to be spread by the Principal/Remediation to form pad/s not more than 0.1 m thick, within the designated pad sorting area (more than one pad may be used);
- The dimensions of each pad are to be documented such that the volume of material can be verified and meet the validation sampling density required;
- ACM fragments are to be collected by raking (teeth >10 cm long and not more than 7 mm spacing) and hand picking of the spread material by the Principal/Remediation Contractor or their appointed contractor and collected ACM fragments will be disposed of off-site to an appropriately licensed waste facility. A minimum of two passes of picking and raking will be made with a 90° direction change between each;
 - Note: other methodologies may be deployed based on a cost/benefit evaluation by Principal/Remediation Contractor such as use of a Table Screen (or similar);

- Following the initial screening process, the Principal/Remediation Contractor or their appointed contractor shall complete a second walkover of the pads to confirm there is no visible ACM;
- Pads will be validated by an appropriately qualified environmental consultant. Should validation fail the pad will be subjected to an additional rake, walk/pick by the Principal/Remediation Contractor or their appointed contractor and re-validated by the environmental consultant until such time as validation is achieved;
- At completion of validation of a prepared pad, it will be excavated and placed in a holding stockpile and the process restarted with the placement of a new pad;
- The footprint of all stockpiles/pads and material underlying impacted fill (following excavation) are to be validated by the environmental consultant. Should validation fail, the failed base of the excavation/pad/stockpile will be excavated a further 0.2 m in the direction of the failure and the validation process repeated until validation is achieved; and
- Materials will be tracked from source, through required remedial activities to final placement/disposal, noting remediation undertaken and validation outcome.

Where treatment and removal of bonded ACM is not feasible, materials can be disposed of off-site to a facility lawfully able to accept such waste. Materials will be required to be classified in accordance with EPA (2014) as outlined in **Section 6.3.3**.

8. Other Remediation Documents

8.1 Environmental Management

8.1.1 Preparation of a Remediation Environmental Management Plan

Prior to commencement of remediation works, a REMP shall be prepared by the Principal/Remedial Contractor which documents the environmental monitoring and management measures required to be implemented during the remediation and construction related activities associated with the construction of the site.

The REMP shall address each of the nominated items in **Section 8.1.2** and shall include the Contingency Plan, referred to in **Section 7**, above. Additional environmental management requirements may be required as part of development consent.

8.1.2 Required Elements/Procedures

An assessment of the proposed activities and the associated elements required to be incorporated into the REMP is provided in **Table 8.1**. The REMP is required to address each of the required elements and procedures in full detail and to include detailed monitoring processes and procedures, corrective actions and reporting requirements.

Table 8.1 Required Elements of the REMP

Element	Specific Minimum Requirements to be included in REMP
1. Dust and Airborne Hazard Control	Dust and asbestos air monitoring. Provisions for dust control based on monitoring results.
2. Flora and Fauna	As appropriate.
3. Heritage/Archaeological	In accordance with relevant heritage/archaeological studies.
4. Visual Impacts	Visual monitoring at site boundary Specific colour requirements for various controls/measures, including PPE (e.g., masks/coveralls).
5. Emergency Response	As appropriate. Procedures required for spill incident response including material storage breach.
6. Noise Control	Hours of operation, consistent with the consent conditions.
7. Traffic	Controls on vehicle movements on public roads. Controls on transport of impacted materials.
8. Protection of Adjoining Structures	As appropriate.
9. Odour Control	Management of all potential odour generating activities (i.e., excavation of petroleum hydrocarbon contaminated soils) with appropriate odour controls incorporating safeguards and monitoring. Daily monitoring of odour levels at site boundary during handling of malodorous materials. Procedures for addressing elevated odour monitoring results, including, but not limited to reduction in earthworks activities within odorous material areas during adverse meteorological conditions; application of odour masking solutions at the odour source or between identified source(s) and receptor(s).
10. Handling of Contaminated Soil and Groundwater	Soil and water management (stockpiling, site access, excavation pump out, reinstatement).
11. Soil Storage/Placement Areas	Soil and water management (stockpiling, site access, excavation pump out, reinstatement). Bunding. Heavy vehicle/personnel decontamination. Site drainage requirements, incorporating clean/dirty areas and modifications to existing surface water and drainage controls beneath retained pavements. Monitoring as required.
12. Sediment Control	Bunding. Collection/treatment/handling impacted sediments.
13. Operation of Site Office	As appropriate.

Element	Specific Minimum Requirements to be included in REMP
14. Decontamination of Heavy Equipment	As appropriate.
15. Environmental Monitoring	Monitoring of dusts, noise, odour and fibres. Monitoring as required for vibration and water releases. Inspection checklists and field forms.
16. Environmental Criteria	Soil and water criteria as presented in this RAP
17. Material Classification	As detailed in this RAP.
18. Community Relations Plan	Specific communication protocols, incorporating nomination of specific contact persons & details and requirements for communications/response register.
19. Incident Reporting	As appropriate, including standard form/checklist.
20. Security and Signage	Secure site perimeter. Site boundary signage.
21. Training	As appropriate.
22. Contact Details	Company/personnel details, including names/phone numbers for: - Principal Contractor - Remediation Consultant - Remediation Contractor - OH&S Compliance - Environmental Compliance
23. Stockpiling	No stockpiles of soil or other materials shall be placed on footpaths or nature strips unless prior Council approval has been obtained. All stockpiles of soil or other materials shall be placed away from drainage lines gutters or stormwater pits or inlets. All stockpiles of soil or other materials likely to generate dust or odours shall be covered. All stockpiles of chemically contaminated soil shall be stored in a secure area and be covered if remaining more than 24 hours. All stockpiles of asbestos contaminated soils shall be kept damp and covered to minimise potential fibre release, and if left for more than 24 hours, be stored in a secure area.
24. P/ASS	All works are required to be undertaken in accordance with the ASSMP (JBS&G 2020b) prepared for the site.

8.1.3 Certification

Prior to commencement of remediation works, the Principal/Remediation Contractor is required to have the REMP endorsed as acceptable by the Environmental Consultant or the client.

A copy of the REMP and the endorsement to the satisfaction of Environmental Consultant/client are required to be provided by the Principal/Remedial Contractor prior to commencement of remediation works.

8.1.4 Hours of Site Operation/Duration of Works

Remediation works shall be completed in accordance with the permissible hours of work and noise as nominated in of the Development Consent.

The appointed remediation contractor will be required to include a proposed schedule of remediation works within the REMP submitted for endorsement as discussed above.

8.2 Health and Safety

8.2.1 Work Health and Safety Management Plan

A WHSP shall be prepared by the Principal/Remediation Contractor prior to commencement of remediation works. The plan shall contain procedures and requirements that are to be implemented as a minimum during the works, in addition to the Contingency Plan, referred to in **Section 7**.

The objectives of the WHSP are:

- To apply standard procedures that minimises risks resulting from the works;

- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards, mandatory safety practices and procedures;
- Monitoring of potential hazards and implementation of corrective measures; and
- Provision for contingencies that may arise while operations are being conducted at the site.

8.2.2 Additional Site-Specific Elements/Procedures

In addition to the normal construction-related matters, the WHSP shall address the following site-specific hazards associated with the works relating to the management of contaminated soil and groundwater:

- Under/aboveground services, specifically former petroleum infrastructure;
- Use of plant and machinery within confined spaces (i.e. tank pit excavations);
- Contact to asbestos contaminated soils;
- Contact with contaminated soil (lead, TRH) other than asbestos; and
- Heat/cold stress.

8.2.3 Asbestos

During asbestos-related remedial works, perimeter asbestos in air monitoring will be conducted at each applicable remedial works area boundary when soil with asbestos are being disturbed. Air monitoring will be conducted on a daily basis at relevant locations whilst disturbance of asbestos contaminated areas takes place.

Air monitoring will be conducted during any ground disturbance activities associated with asbestos remedial works to verify that implementation of appropriate control measures have been successful at managing the risk of air borne fibre generation. Air monitoring will be undertaken in accordance with the requirements of the National Occupational Health and Safety Commission (NOHSC) Asbestos Code of Practice and Guidance Notes, in particular the *Guidance note for the estimation of airborne asbestos dust* [NOHSC 3002:2005].

9. Conclusions and Recommendations

9.1 Conclusions

Overall, it is considered that the proposed actions outlined in this RAP conform to the requirements of the *Contaminated Sites Guidelines for the NSW Site Auditor Scheme (3rd Edition)* (EPA 2017) because they are: technically feasible; environmentally justifiable; and consistent with relevant laws policies and guidelines endorsed by NSW EPA.

Subject to the successful implementation of the measures described in this RAP and the recommendations below, it is concluded that the site can be made suitable for the intended uses and that the risks posed by contamination can be managed in such a way as to be adequately protective of human health and the environment.

9.2 Recommendations

It is recommended that the processes outlined in this RAP be implemented and that the following documentation be developed and implemented to ensure the risks and impacts during remediation works are controlled in an appropriate manner:

- A REMP, to document the monitoring and management measures required to control the environmental impacts of the works and ensure the validation protocols are being addressed; and
- A WHSP to document the procedures to be followed to manage the risks posed to the health of the remediation workforce.

10. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

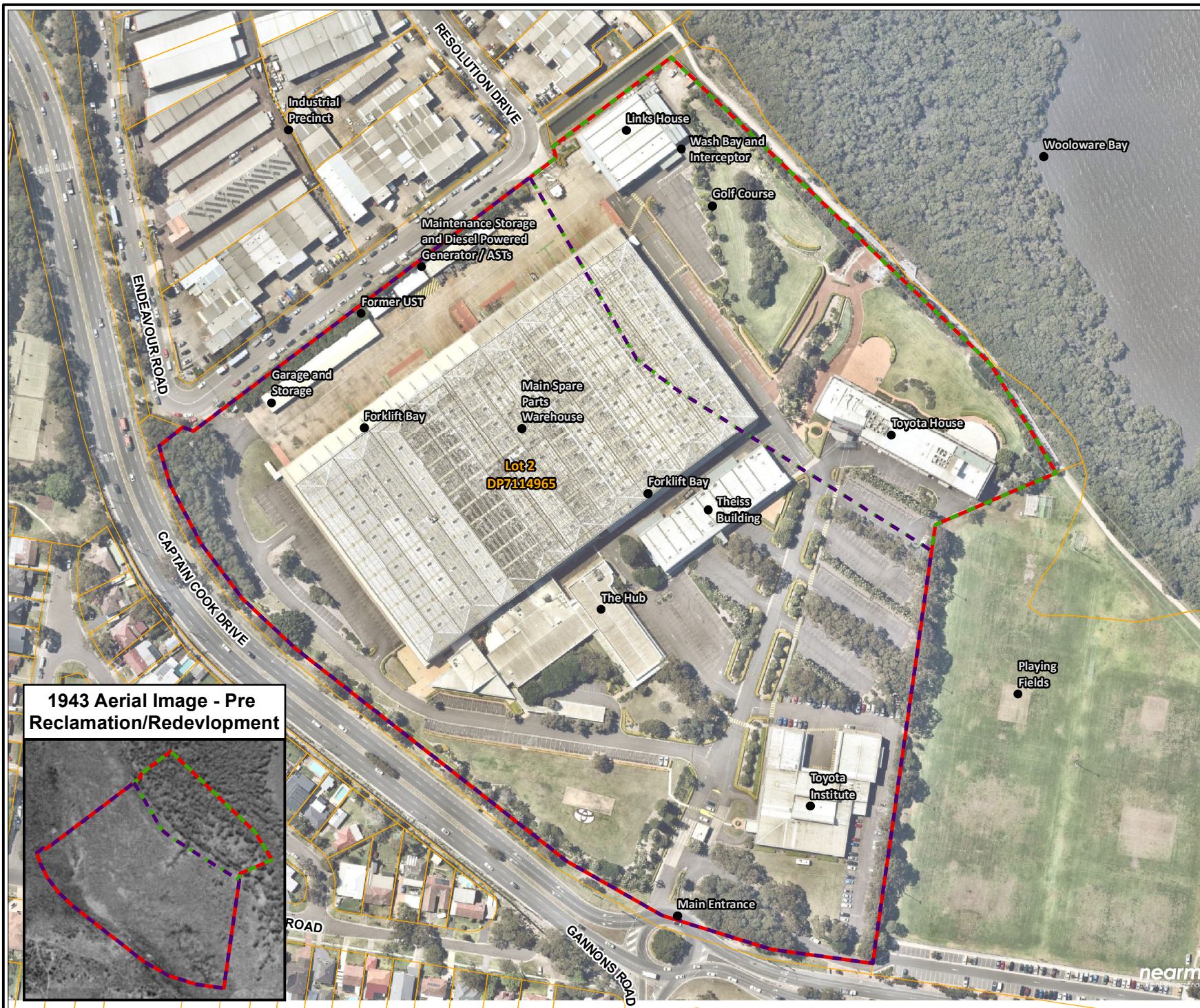
Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures



Legend Approximate Site Boundary	
Job No: 58037	
Client: Aliro	
Version: R03 Rev A	Date 26/08/2020
Drawn By: JA	Checked By: CK
Scale 1:40,000 	
Coord. Sys. GDA 1994 MGA Zone 56	
13 Endeavour Road, Caringbah NSW	
SITE LOCATION	
FIGURE 1	



Legend

- Approximate Site Boundary
- Cadastre (NSW LPI, 2019)
- Southern Portion of the Site: Reclaimed Alluvial Deposits
- Northern Portion of the Site: Reclaimed Tidal Mangrove Swamp
- Site Features

Job No: 58037

Client: Aliro

Version: R03 Rev A	Date 15/09/2020
Drawn By: JA	Checked By: CK

Scale 1:2,750

Coord. Sys. GDA 1994 MGA Zone 56

13 Endeavour Road, Caringbah NSW

SITE LAYOUT

FIGURE 2



Legend

Approximate Site Boundary

Staging

Stage 1 E1 Warehouse Developable Area

Stage 2

Job No: 58037

Client: Aliro

Version: R03 Rev 3	Date 10/11/2021
Drawn By: RF	Checked By: CK

Scale 1:2,500

Coord. Sys. GDA 1994 MGA Zone 56

**13 Endeavour Road,
Caringbah NSW**

PROPOSED LAYOUT

FIGURE 3



Legend

 Approximate Site Boundary

Sample Locations

- Golder 1998
- CES 2005
- NA 2012
- ⊗ Borehole, AECOM 2019
- ⊗ Borehole/Groundwater, AECOM 2019
- ⊗ Borehole, JBS&G 2020a
- ⊗ Ground Gas Wells, JBS&G 2020a
- ⊗ Borehole, JBS&G 2020c
- ⊗ Groundwater, JBS&G 2020c
- ⊗ Soil Vapour, JBS&G 2020c



Job No: 58037

Client: Aliro

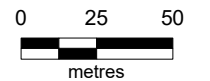
Version: R03 Rev A

Date 15/09/2020

Drawn By: JA

Checked By: CK

Scale 1:2,500

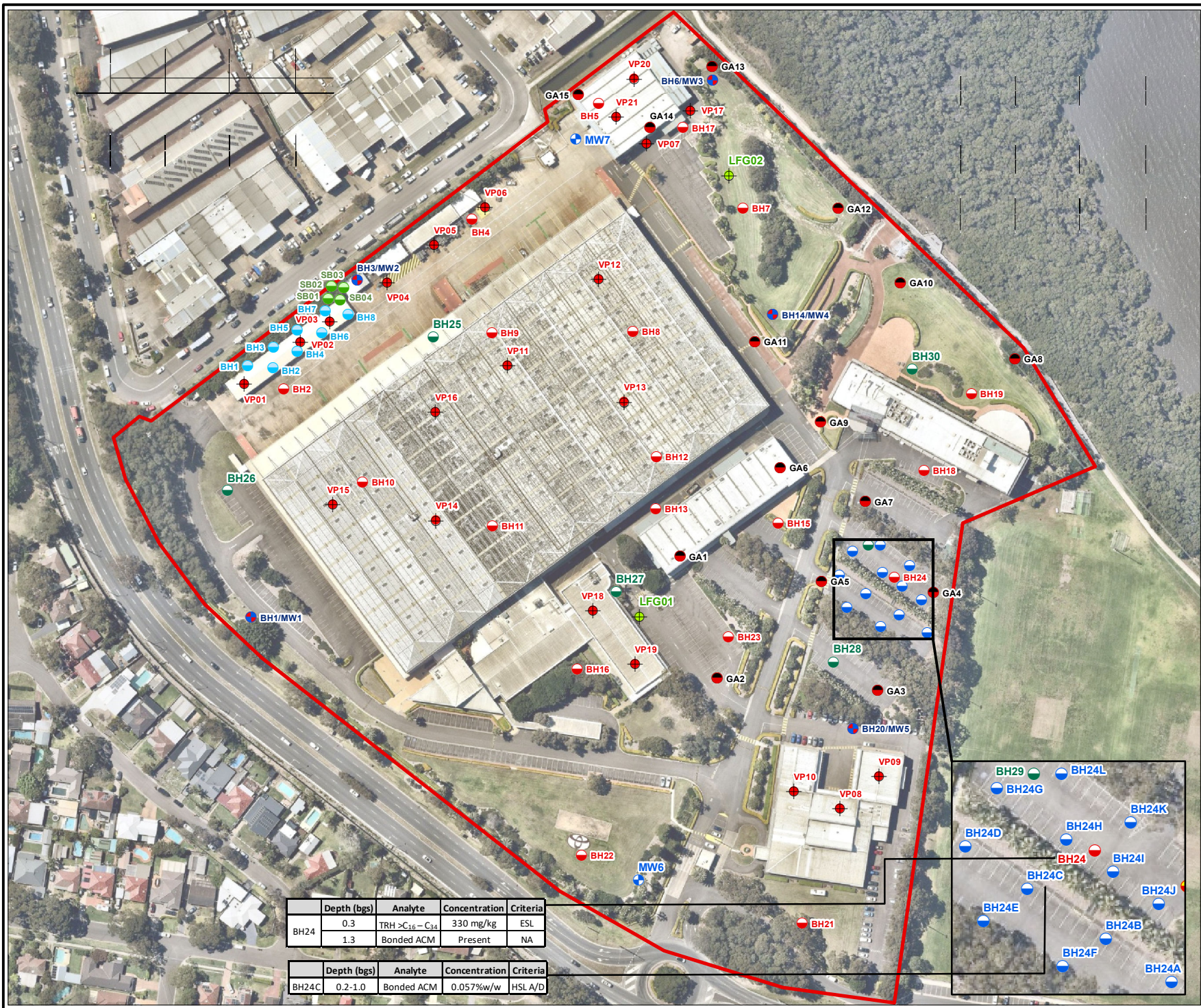


Coord. Sys. GDA 1994 MGA Zone 56

**13 Endeavour Road,
Caringbah NSW**

SAMPLE LOCATIONS

FIGURE 4



	Depth (bgs)	Analyte	Concentration	Criteria
BH24	0.3	TRH >C ₁₆ -C ₃₄	330 mg/kg	ESL
	1.3	Bonded ACM	Present	NA

	Depth (bgs)	Analyte	Concentration	Criteria
BH24C	0.2-1.0	Bonded ACM	0.057%w/w	HSL A/D

Legend

- Approximate Site Boundary
- Historical Sample Locations**
 - Test Pit Location, Golder 1998
 - Borehole Location, CES 2005
 - Borehole Location, AECOM 2019
 - Borehole/Groundwater Monitoring Well Location, AECOM 2019
 - Sample Location, Noel Arnold & Ass. 2012
 - Borehole Location, JBS&G 2019
 - Groundwater Monitoring Location, JBS&G 2019
 - Soil Vapour Sample Location, JBS&G 2019
- Sample Locations**
 - Borehole Location
 - Ground Gas Monitoring Wells

Job No: 58037

Client: Aliro

Version: R02 Rev A	Date 26/08/2020
Drawn By: JA	Checked By: CK

Scale 1:2,500

Coord. Sys. GDA 1994 MGA Zone 56

13 Endeavour Road, Caringbah NSW

Exceedances Requiring Remediation/Management

FIGURE 5

Appendix A Design Plans

Concept Masterplan

5.4 Indicative Masterplan

The indicative masterplan is structured around the extant built form and existing road network to allow the project to be staged and be flexible in its delivery.

A new plaza will be public open space to the wider context and provide community, and commercial functions - establishing a central place for gathering.

Internal vehicular circulation has been minimised to reduce conflicts with pedestrians but consideration has been made to ensure all buildings will have a safe and secure front door and car drop off area.

Commuter car parks will be housed within each of the buildings that are vertically sleeved by commercial uses at ground. In time, these will have the capacity to be converted to commercial floorspace as the future market demand dictates and demand for parking reduces.

Communal roof terraces will provide significant amount of amenity for workers with easy and accessible connections down to the more public ground plane that offers convenient and direct access to Solander Fields and the foreshore shared path.

Existing trees with notable retention value will be retained wherever possible - especially on the boundaries of the site and along Toyota Avenue with its strong tree'd and vegetated character.

KEY

- ① Pedestrian & Cycle Shared Path
- ② 40m Mean High Water Mark Setback
- ③ Bio-Swale / Overland Flow Path
- ④ Embellished Toyota Avenue
- ⑤ Private Shuttle Bus Drop Off Bay
- ⑥ New Open Space
- ⑦ Significant Stands of Existing Trees Retained
- ⑧ New Public Plaza
- ⑨ Potential New Public Bus Stops
- ⑩ Existing Main Warehouse Building Retained
- ⑪ Service Area
- ⑫ New Internal Service Road



Concept Masterplan

5.6 Indicative Ground Floor Plan

The ground floor plan has been developed to balance the basic functional needs of the development with an aspirational vision to establish a lively and active ground plane that provides a variety of building uses.

A vibrant site 'requires an adequate level of commercial floor space to support a range of retail, business, entertainment and community uses to serve the needs of local residents, workers and visitors. The commercial floor space also plays a vital role in generating employment opportunities in accessible locations for the wider community. A successful centre needs continuous street level retail and commercial activities that enliven the public domain and promote a safe and secure environment.'

Source: https://www.randwick.nsw.gov.au/__data/assets/pdf_file/0017/26045/Kingsford-Centre.pdf

Generally, with the exception of the industrial / warehouse buildings in the northern half of the site, the majority of the ground level storey provides food and beverage, recreation or commercial uses, with commercial lobbies and some back of house spaces.

Car park entrances are provided in the least conspicuous (yet functional) locations within almost all buildings to provide a car parking strategy that allows each building to function independently. The car parking is generally provided at levels 01 and 02 and are likely to be able to be converted into additional employment floorspace as future demand dictates.

KEY

- Industrial / Warehouse
- Ancillary Industrial / Warehouse Office
- Office and Business Premises
- Food & Beverage
- Recreation
- Hotel
- Car Parking
- Building Entrance
- Lobby Entrance
- Car Park Entrance



LEGEND

CUT:	FILL:
-5.0 TO -2.5m	0.0 TO 0.1m
-2.5 TO -1.5m	0.1 TO 0.25m
-1.5 TO -1.0m	0.25 TO 0.5m
-1.0 TO -0.75m	0.5 TO 0.75m
-0.75 TO -0.5m	0.75 TO 1.0m
-0.5 TO -0.25m	1.0 TO 1.5m
-0.25 TO -0.1m	1.5 TO 2.5m
-0.1 TO 0.0m	2.5 TO 5.0m

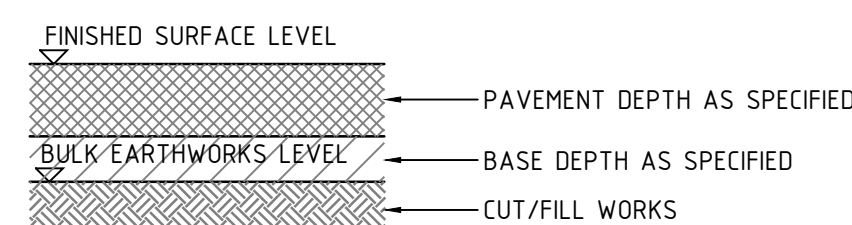
BULK EARTHWORKS NOTES

1. BULK EARTHWORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH AS3798-2007, GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS.
2. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL INVESTIGATION REPORT FOR SPECIFIC SITE CONDITIONS AND WORKS METHODOLOGY.
3. CUT TO FILL DEPTHS SHOWN ARE BASED ON LEVELS AND PAYMENT THICKNESS' IN COMPARISON TO SURVEY REFERENCED IN DAY201 RESULTING IN THE FOLLOWING CUT TO FILL VOLUMES:

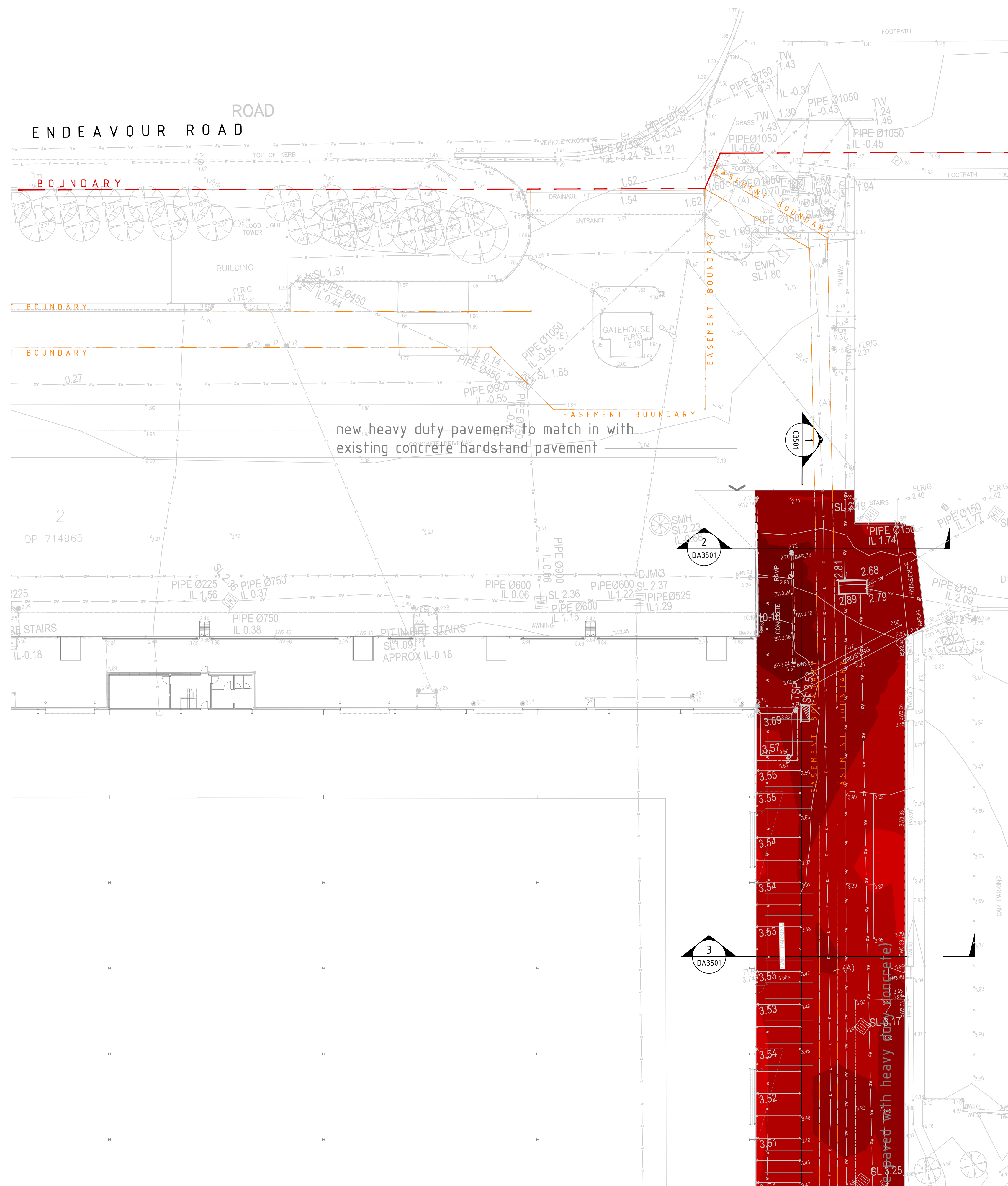
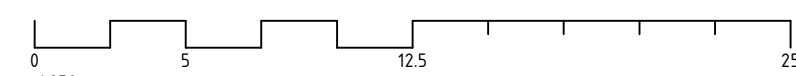
CUT = 899.4m³
FILL = 0.2m³
TOTAL CUT / FILL = 899.2m³

FINAL EXPORT VOLUME APPROX = 899.2m³

4. STRIPPING OF THE FOLLOWING SURFACES HAS BEEN TAKEN INTO ACCOUNT IN THE ABOVE VOLUME CALCULATIONS:
EXISTING EXTERNAL HARDESTAND = ---mm
5. VOLUMES DETAILED ABOVE DO NOT TAKE INTO ACCOUNT STRIPPING OF TOPSOIL, BULKING & COMPACTION OF THE MATERIAL, TRENCHING SPOIL & TEMPORARY SEDIMENT BASIN.
6. VOLUMES BASED ON THE FOLLOWING PAVEMENT THICKNESS' TAKEN FROM FINISHED SURFACE:
 - HARDESTAND AREA
280mm (180mm SLAB + 100mm SUB-BASE)
 - FOOTPATH AREA
200mm (100mm SLAB + 100mm SUB-BASE)
6. THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT, ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION.
7. REFER TO DA3201 FOR BULK EARTHWORKS CONTOUR PLAN
8. REFER TO DA3501 FOR BULK EARTHWORKS SECTIONS



TYPICAL BULK EARTHWORKS SECTION DETAIL



REFER TO C3103 FOR CONTINUATION

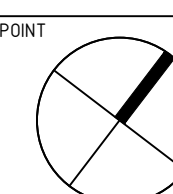
TENDER ISSUE

[illegible]

1. REFER TO DRAWING C3102 FOR NOTES AND LEGEND

REFER TO C3102 FOR CONTINUATION

IMPORTANT	
<ul style="list-style-type: none"> DO NOT SCALE OFF THIS DRAWING. USE DIMENSIONS & ARCHITECTURAL DRAWINGS ONLY. 	
<ul style="list-style-type: none"> DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATION. 	
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DATE	AMENDMENT	INIT	REV
17.05.21	TENDER ISSUE - DA1	JK	1
24.05.21	TENDER ISSUE - DA1	JK	2

S									
w									
D _s									
w									
k									
K									

STRUCTURAL
-
MECHANICAL
-
ELECTRICAL
-
CIVIL
SPARKS AND PARTNERS CONSULTING ENGINEERS

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 **FPA**
AUSTRALIA
Fire Protection Association Australia
COMMITTED TO EXCELLENCE

 **DNV-GL**
QUALITY SYSTEM CERTIFICATION

 **HCAA**
HYDRO-CARBON ASSOCIATION

DRAWING TITLE

CIVIL WORKS
BULK EARTHWORKS CUT TO FILL
PLAN - SHEET 3

DATE	DRAWN	DESIGNED	CHECKED
APRIL 2021	JK	JK	B
PROJECT No	SCALE	SIZE	REVISION
21087	1:250 @ A1	A1	
	DRAWING No	C3103	2

TENDER ISSUE

LEGEND

CUT:

-5.0 TO -2.5m

-2.5 TO -1.5m

-1.5 TO -1.0m

-1.0 TO -0.75m

-0.75 TO -0.5m

-0.5 TO -0.25m

-0.25 TO -0.1m

-0.1 TO 0.0m

FILL:

0.0 TO 0.1m

0.1 TO 0.25m

0.25 TO 0.5m

0.5 TO 0.75m

0.75 TO 1.0m

1.0 TO 1.5m

1.5 TO 2.5m

2.5 TO 5.0m

BULK EARTHWORKS NOTES

1. BULK EARTHWORKS ARE TO BE TO BE UNDERTAKEN IN ACCORDANCE WITH AS3798-2007, GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS.

2. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL INVESTIGATION REPORT FOR SPECIFIC SITE CONDITIONS AND WORKS METHODOLOGY.

3. CUT TO FILL DEPTHS SHOWN ARE BASED ON LEVELS AND PAVEMENT THICKNESS' IN COMPARISON TO SURVEY REFERENCED IN DA1201 RESULTING IN THE FOLLOWING CUT TO FILL VOLUMES:

CUT = 107.3m³

FILL = 0.0m³

TOTAL CUT = 107.3m³

FINAL EXPORT VOLUME APPROX = 107.3m³

4. VOLUMES DETAILED ABOVE DO NOT TAKE INTO ACCOUNT STRIPPING OF TOPSOIL, BULKING & COMPACTION OF THE MATERIAL, TRENCHING SPOIL & TEMPORARY SEDIMENT BASIN.

5. VOLUMES BASED ON THE FOLLOWING PAVEMENT THICKNESS' TAKEN FROM FINISHED SURFACE:

HARDSTAND AREA

280mm (180mm SLAB + 100mm SUB-BASE)

6. THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT. ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION.

7. REFER TO DA3271 FOR BULK EARTHWORKS CONTOUR PLAN

8. REFER TO DA3571 FOR BULK EARTHWORKS SECTIONS

FINISHED SURFACE LEVEL

BULK EARTHWORKS LEVEL

CUT/FILL WORKS

PAVEMENT DEPTH AS SPECIFIED

BASE DEPTH AS SPECIFIED

TYPICAL BULK EARTHWORKS SECTION DETAIL

REFER BELOW FOR CONTINUATION

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NORTH POINT

REFERENCES

DATE	AMENDMENT	INIT	REV
28.05.21	ISSUED FOR COORDINATION	JK	1
07.06.21	CDC ISSUE	JK	2
24.06.21	CDC ISSUE	JK	3

STRUCTURAL

-

MECHANICAL

-

ELECTRICAL

-

CIVIL

SPARKS AND PARTNERS CONSULTING ENGINEERS

BUILDER

CLIENT

FDC

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FPA AUSTRALIA

Fire Protection Association Australia

CORPORATE MEMBER

DNV-BL

ISO 9001

HCAA

DRAWING TITLE

CDC4

BULK EARTHWORKS CUT TO FILL

PLAN

DATE

JUNE 2021

SCALE

1:250 @ A1

SIZE

A1

REVISION

3

PROJECT No

21087

DRAWING No

C3171

DRAWN

JK

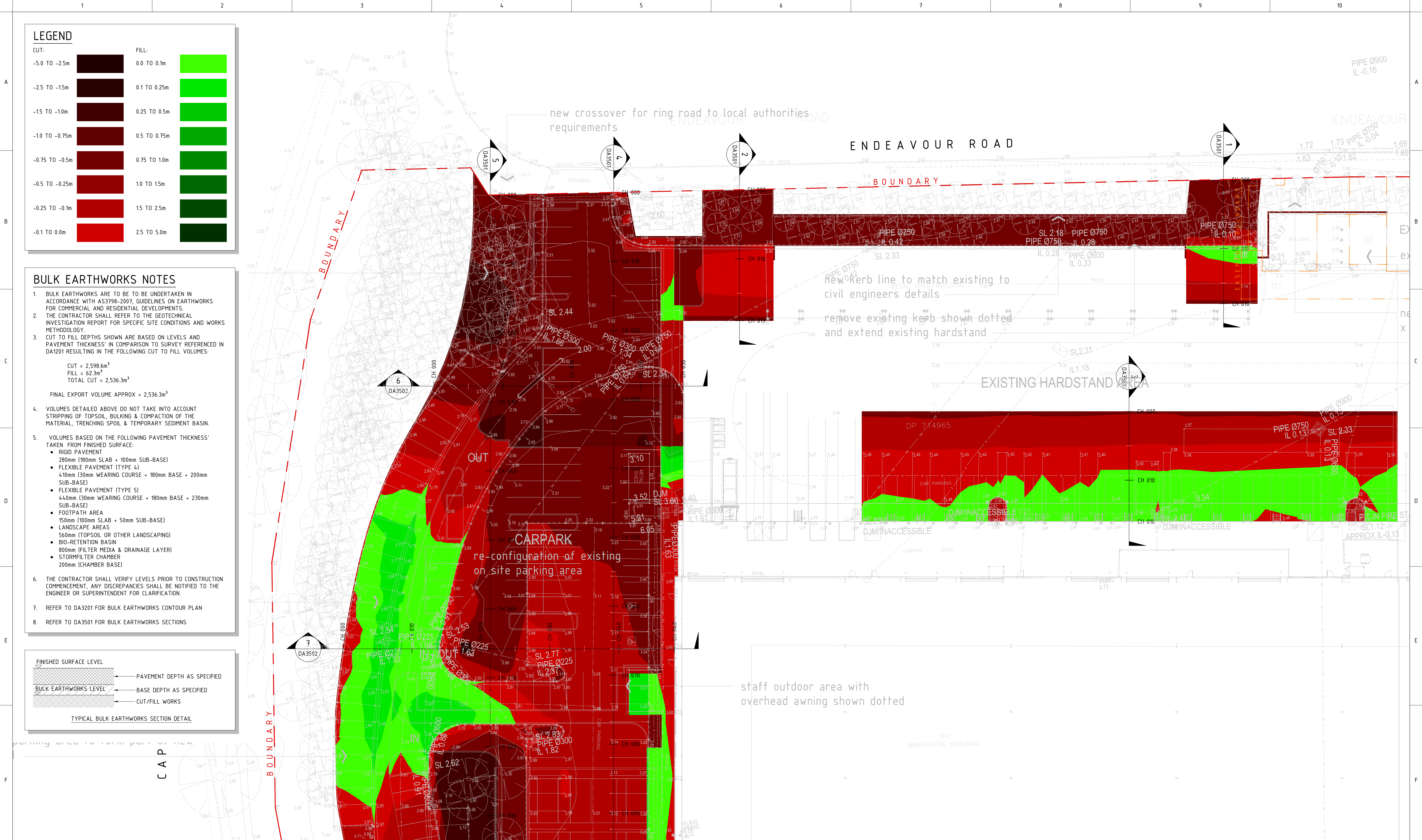
DESIGNED

JK












CHECKED

BB

COMPLYING DEVELOPMENT ISSUE



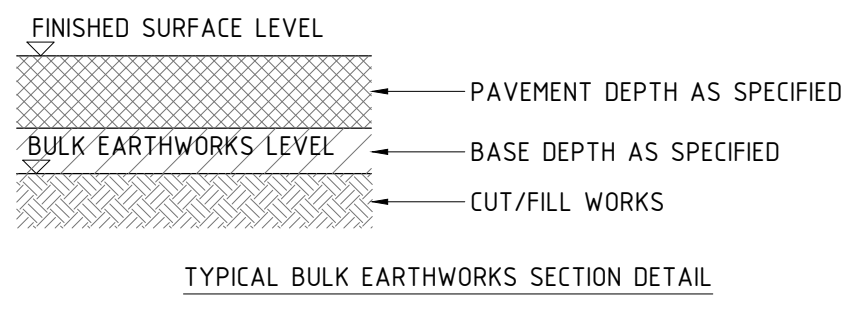
LEGEND

CUT:		FILL:	
-5.0 TO -2.5m		0.0 TO 0.1m	
-2.5 TO -1.5m		0.1 TO 0.25m	
-1.5 TO -1.0m		0.25 TO 0.5m	
-1.0 TO -0.75m		0.5 TO 0.75m	
-0.75 TO -0.5m		0.75 TO 1.0m	
-0.5 TO -0.25m		1.0 TO 1.5m	
-0.25 TO -0.1m		1.5 TO 2.5m	
-0.1 TO 0.0m		2.5 TO 5.0m	

- ### BULK EARTHWORKS NOTES
- BULK EARTHWORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH AS3798-2007, GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS.
 - THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL INVESTIGATION REPORT FOR SPECIFIC SITE CONDITIONS AND WORKS METHODOLOGY.
 - CUT TO FILL DEPTHS SHOWN ARE BASED ON LEVELS AND PAVEMENT THICKNESS IN COMPARISON TO SURVEY REFERENCED IN DA1201 RESULTING IN THE FOLLOWING CUT TO FILL VOLUMES:

CUT = 2,598.6m³
FILL = 62.3m³
TOTAL CUT = 2,536.3m³

FINAL EXPORT VOLUME APPROX = 2,536.3m³
 - VOLUMES DETAILED ABOVE DO NOT TAKE INTO ACCOUNT STRIPPING OF TOPSOIL, BULKING & COMPACTION OF THE MATERIAL, TRENCHING SPOIL & TEMPORARY SEDIMENT BASIN.
 - VOLUMES BASED ON THE FOLLOWING PAVEMENT THICKNESS TAKEN FROM FINISHED SURFACE:
 - RIGID PAVEMENT
280mm (180mm SLAB + 100mm SUB-BASE)
 - FLEXIBLE PAVEMENT (TYPE 4)
410mm (30mm WEARING COURSE + 180mm BASE + 200mm SUB-BASE)
 - FLEXIBLE PAVEMENT (TYPE 5)
440mm (30mm WEARING COURSE + 180mm BASE + 230mm SUB-BASE)
 - FOOTPATH AREA
150mm (100mm SLAB + 50mm SUB-BASE)
 - LANDSCAPE AREAS
560mm (TOPSOIL OR OTHER LANDSCAPING)
 - BIO-RETENTION BASIN
800mm (FILTER MEDIA & DRAINAGE LAYER)
 - STORMFILTER CHAMBER
200mm (CHAMBER BASE)
 - THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT, ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION.
 - REFER TO DA3201 FOR BULK EARTHWORKS CONTOUR PLAN
 - REFER TO DA3501 FOR BULK EARTHWORKS SECTIONS



0 1250 5 12.5 25

IMPORTANT

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REFERENCES

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DATE	AMENDMENT	INIT	REV	DATE	AMENDMENT	INIT	REV
04.06.21	ISSUED FOR COORDINATION	JK	1				
25.06.21	DA ISSUE	JK	2				
29.06.21	DRAFT DA ISSUE	JK	3				
09.07.21	DA ISSUE	JK	4				
18.08.21	DA ISSUE	JK	5				

STRUCTURAL

MECHANICAL

ELECTRICAL

CIVIL

SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT

BUILDER

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DRAWING TITLE

DA

CONCEPT BULK EARTHWORKS CUT TO FILL PLAN - SHEET 1

DATE

AUG 2021

DRAWN

JK

DESIGNED

JK

CHECKED

BB

PROJECT No

21087

SCALE

1:250 @ A1

SIZE

A1

REVISION

5

DRAWING No

DA3101

W:\2 - PROJECTS\2021\21087 - SITE E1, ENDEAVOUR RD, CARINGBAH\DESIGN DRAWINGS\04 CIVIL\DA DRAWINGS\21087_DA3101.DWG

BULK EARTHWORKS NOTES

1. REFER TO DRAWING DA3101 FOR NOTES AND LEGEND

REFER TO DA3101 FOR CONTINUATION

f new pavement to form part of
ring road shown hatched

rete kerb lines to match existing to
neers details

parking areas re-configured for
ing layouts

internal road way retained

on site parking to be retained

PICKUP AREA

CARPARK / LOADING

pickup canopy over shown dotted with full
height slat screen wall to south elevation

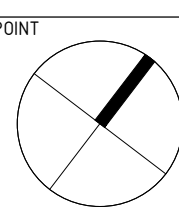
EXISTING BUILDING TO BE RETAINED
BUILDING E5

BUILDING

DEVELOPMENT APPLICATION ISSUE

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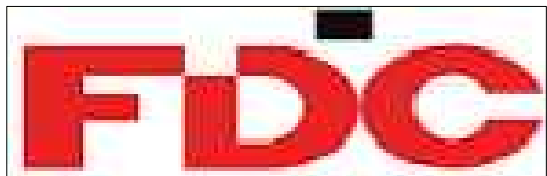
REFERENCES



DATE	AMENDMENT	INIT	REV	DATE	AMENDMENT	INIT	REV
04.06.21	ISSUED FOR COORDINATION	JK	1				
25.06.21	DA ISSUE	JK	2				
29.06.21	DRAFT DA ISSUE	JK	3				
09.07.21	DA ISSUE	JK	4				
18.08.21	DA ISSUE	JK	5				

STRUCTURAL
-
MECHANICAL
-
ELECTRICAL
-
CIVIL
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PROJECT

SITE E1, ENDEAVOUR RD, CARINGBAH

ARCHITECT



DRAWING TITLE			
DA CONCEPT BULK EARTHWORKS CUT TO FILL PLAN - SHEET 4			
DATE	DRAWN	DESIGNED	CHECKED
AUG 2021	JK	JK	BB
PROJECT No	SCALE	SIZE	REVISION
21087	1:250 @ A1	A1	
DRAWING No	DA3104		5

Appendix B Analytical Summary Tables

Table A: Soil Analytical Results
Project Number: 58037
Project Name: Carrington Toyota



JBS&G

	Metals & Metalloids								TPHs (NEPC 1999)				TRHs (NEPC 2013)				BTEX				Polycyclic Aromatic Hydrocarbons																								
	Arsenic (Total)	Cadmium	Chromium (Total)	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	Co Fraction	Co-Cl4 Fraction	Co-Cl3 Fraction	Co-Cl2 Fraction	Co-Cl Fraction (Total)	Co-Cl4 Fraction	Co-Cl3 Fraction	Co-Cl2 Fraction	Co-Cl Fraction (Total)	Co-Cl6 less Naphthalene (P2)	Co-Cl6 Fraction	Co-Cl5 less BTEX (P3)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)	Naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Ben[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[e]pyrene	Chrysene	Benzo[a,h]anthracene	Fluorene	Indeno[1,2,3-c,d]pyrene	PAHs (Total)	Naphthalene	Pyrene			
	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	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	
EQ/L	2	0.4	5	5	5	0.1	5	5	20	20	50	50	50	50	50	50	50	50	50	20	20	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
NEPM 2013 EIL - Commercial Industrial (specific)	160		310 ¹⁵	280 ¹⁵	1800		290 ¹⁵	620 ¹⁵																																					
NEPM 2013 EIL - Urban Residential (specific)	100		190 ¹⁵	150 ¹⁵	1100		170 ¹⁵	400 ¹⁵																																					
NEPM 2013 EIL Commercial and Industrial, Coarse Soil																																													
NEPM 2013 EIL Urban Residential and Public Open Space, Coarse Soil																																													
NEPM 2013 HSL Asbestos in Soil - Bonded ACM - Commercial/Industrial - HSL D																																													
NEPM 2013 HSL Asbestos in Soil - Residential - HSL A																																													
NEPM 2013 HSL Asbestos in Soil - FA & AF - HSL																																													
NEPM 2013 HSL Asbestos in Soil - FA & AF - HSL																																													
NEPM 2013 Mgmt Limits - Commercial and Industrial, Coarse																																													
NEPM 2013 Mgmt Limits - Residential, Parkland and Public Open Space, Coarse																																													
NEPM 2013 Soil HIL A	100 ¹¹²	20	100 ¹¹³	6000	300 ¹¹⁴	40 ¹¹⁵	400	7400						1000 ¹¹⁰	3500	10000			700 ¹¹¹																										
NEPM 2013 Soil HIL D	3000 ¹¹²	900	3600 ¹¹³	240000	1500 ¹¹⁴	730 ¹¹⁵	6000	400000						1000 ¹¹⁰	2500	10000			700 ¹¹¹																										
NEPM 2013 Soil HSL A & HSL B for Vapour Intrusion - Sand 0 to <1m																																													
NEPM 2013 Soil HSL D for Vapour Intrusion - Sand 0 to <1m																																													

Field_ID	Sampled_Date-Time	Sample_Depth_Range	Lab_Report_Number	<2	<0.4	<5	240	<5	<0.1	5.5	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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[illegible]

Table A: Soil Analytical Results
Project Number: 58037
Project Name: Carrington Toyota

[illegible][illegible][illegible]

Table A: Soil Analytical Results
Project Number: 58037
Project Name: Carringbah Toyota

[illegible][illegible][illegible]



	TPHs (NEPC 1999)					TRHs (NEPC 2013)					BTEXN					VOC	Chlorinated Alkanes																					
	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Total)	>C10-C16 Fraction	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Total)	>C10-C16 less Naphthalene (F2)	C6-C10 Fraction	C6-C10 less BTEX (F1)	Benzene	Ethylbenzene	Toluene	Xylene (o)	Xylene (m & p)	Xylene (Total)	Naphthalene	THM (total)*	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Trichlorofluoromethane		
	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	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	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
EQL	0.02	0.05	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.05	0.02	0.02	0.001	0.001	0.001	0.001	0.002	0.003	0.01	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
ANZG (2018) Marine water 95% toxicant DGVs													0.7 ^{#1}						0.07 ^{#1}					1.9 ^{#2}														
NEMP 2018 PFAS Tier 1 Screening Values - Interim Marine 95% species protection																																						
NEPM 2013 Groundwater HSL A & HSL B for Vapour Intrusion										1 ^{#11}	1 ^{#12}	0.8 ^{#13}	NL ^{#13}	NL ^{#13}				NL ^{#13}	NL ^{#13}																			
NEPM 2013 Groundwater HSL A & HSL B for Vapour Intrusion - Sand 2 to <4m										1 ^{#14}	1 ^{#15}	0.8	NL	NL				NL	NL																			
NEPM 2013 Groundwater HSL D for Vapour Intrusion - Sand 2 to <4m										NL ^{#14}	6 ^{#15}	5	NL	NL				NL	NL																			
Indiana Department of Environmental Management																																						

Field_ID	Sampled_Date-Time	Lab_Report_Number																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
MW1	22/01/2020	698107	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Statistical Summary																																				
Number of Results	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7		
Number of Detects	0	0	2	0	2	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Minimum Concentration	<0.02	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Minimum Detect	ND	ND	0.1	ND	0.1	0.09	0.2	ND	0.2	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.02	<0.05	0.2	<0.1	0.2	0.09	0.2	<0.1	0.2	0.09	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Maximum Detect	ND	ND	0.2	ND	0.2	0.09	0.2	ND	0.2	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.01	0.025	0.079	0.05	0.079	0.034	0.071	0.05	0.071	0.034	0.01	0.01	0.0005	0.0005	0.0005	0.0005	0.001	0.0015	0.005	0.0025	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	
Median Concentration	0.01	0.025	0.05	0.05	0.05	0.025	0.05	0.05	0.05	0.025	0.01	0.01	0.0005	0.0005	0.0005	0.0005	0.001	0.0015	0.005	0.0025	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	
Standard Deviation	0	0	0.057	0	0.057	0.025	0.057	0	0.057	0.025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Env Stds Comments

#1:Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief for spread of data and its significance.

#2:Very Low reliability

#3:Moderate reliability. Ammonia as total ammonia, measured as [NH3-N] adjusted using pH 7.

#4:TV based on NH3 as NH3 (needs to be calculated based on in situ pH and temperature).

#5:Adopted from WHO Petroleum Products in Drinking Water 2008

#6:Adopted from WHO Drinking Water Guideline 2011

#7:Adopted from US EPA RSL - Tapwater (November 2015) - THQ = 0.1

#8:These values may be used to screen for direct toxicity to aquatic organisms. OEH can provide advice on which value to use. Data sourced from DoEE 2016

#9:TV adopted from the ADWG (2011) Updated March 2015.

#10:TV May not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.

#11:Sensitive setting HSL A and B Sand 2m to 4m criteria adopted. To obtain F2 subtract naphthalene from >C10-C16. NL - Not Limiting.

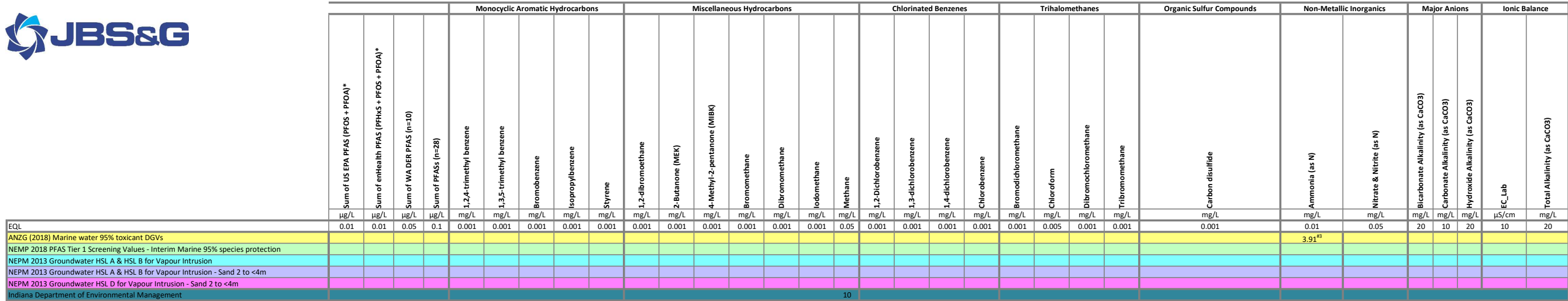
#12:Sensitive setting HSL A and B Sand 2m to 4m criteria adopted. To obtain F1 subtract the sum of BTEX from C6-C10.

#13:Sensitive setting HSL A and B Sand 2m to 4m criteria adopted. NL - Not Limiting.

#14:To obtain F2 subtract naphthalene from >C10-C16.

#15:To obtain F1 subtract the sum of BTEX from C6-C10.

Project Number: 58037
Project Name: Carringbah Toyota

[illegible]


Statistical Summary																																				
Number of Results	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	7	7	7	7	7	7	7	7	7	7	7	7	4	4	4	4	4	4		
Number of Detects	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	
Minimum Concentration	<0.01	<0.01	<0.05	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.4	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.97	<0.05	680	<10	<20	1500	680	
Minimum Detect	0.03	0.01	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.97	ND	680	ND	1500	680	
Maximum Concentration	<100	<100	<100	<100	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	6.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	<0.05	1500	<10	<20	28000	1500	
Maximum Detect	0.03	0.05	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23	ND	1500	ND	28000	1500	
Average Concentration	7.2	7.2	7.2	7.2	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	2.1	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0025	0.0005	0.0005	0.0005	0.0005	0.0005	10	0.025	988	5	10	14775	988	
Median Concentration	0.005	0.005	0.025	0.05	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.875	0.0005	0.0005	0.0005	0.0005	0.0005	0.0025	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	9	0.025	885	5	10	14800	885	
Standard Deviation	19	19	19	19	0	0	0	0	0	0	0	0	0	0	0	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	9.2	0	363	0	0	13653	363
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0

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- #1: Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to #2: Very Low reliability
- #3: Moderate reliability. Ammonia as total ammonia, measured as [NH3-N] adjusted using pH 7.
- #4: TV based on NH3 as NH3 (needs to be calculated based on in situ pH and temperature).
- #5: Adopted from WHO Petroleum Products in Drinking Water 2008
- #6: Adopted from WHO Drinking Water Guideline 2011
- #7: Adopted from US EPA RSL - Tapwater (November 2015) - THQ = 0.1
- #8: These values may be used to screen for direct toxicity to aquatic organisms. OEH can provide
- #9: TV adopted from the ADWG (2011) Updated March 2015.
- #10: TV May not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for
- #11: Sensitive setting HSL A and B Sand 2m to 4m criteria adopted. To obtain F2 subtrack naophthal
- #12: Sensitive setting HSL A and B Sand 2m to 4m criteria adopted. To obtain F1 subtrack the sum
- #13: Sensitive setting HSL A and B Sand 2m to 4m criteria adopted. NL - Not Limiting.
- #14: To obtain F2 subtrack naophthalene from >C10-C16.
- #15: To obtain F1 subtrack the sum of BTEX from C6-C10.

Table C: Soil Vapour Analytical Results
Project Number: 58037
Project Name: Caringbah Toyota





	TRHs (NEPC 2013)		BTEXN					Chlorinated Alkanes													
	>C10-C16 Fraction (F2)	C6-C10 Fraction (F1)	Benzene	Ethylbenzene	Toluene	Xylene (Total)	Naphthalene	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Trichlorofluoromethane
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL	3.33333334	3.33333334	0.083333334	0.083333334	0.083333334	0.250000001	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334
NEPM 2013 Soil Vapour HSL A & HSL B - Sand 0 to <1m	110	45	1	330	1300	220	0.8														
NEPM 2013 Soil Vapour HSL D - Sand 0 to <1m	NL	260	4	1300	4800	840	3														

Field_ID	Sampled_Date-Time	Lab_Report_Number	<3.333	<3.333	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP01	28/01/2020	698996	<3.333	<3.333	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP04	28/01/2020	698996	<3.333	<3.333	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP07	28/01/2020	698996	<3.333	<3.333	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP09	28/01/2020	698996	<3.333	82.003	<0.08333	2	<0.08333	2.667	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP11	28/01/2020	698996	<3.333	<3.333	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP14	28/01/2020	698996	<3.333	<3.333	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP16	28/01/2020	698996	<3.333	<3.333	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
VP19	28/01/2020	698996	2.458	10.458	<0.02083	0.875	<0.02083	1.167	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083
VP21	28/01/2020	698996	<3.333	28.33	<0.08333	<0.08333	<0.08333	<0.25	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333

Statistical Summary																					
Number of Results	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Number of Detects	1	3	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	2.458	<3.333	<0.02083	<0.08333	<0.02083	<0.25	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083
Minimum Detect	2.458	10.458	ND	0.875	ND	1.167	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<3.333	82.003	<0.08333	2	<0.08333	2.667	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333
Maximum Detect	2.458	82.003	ND	2	ND	2.667	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	1.8	15	0.038	0.35	0.038	0.52	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Median Concentration	1.6665	1.6665	0.041665	0.041665	0.041665	0.125	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665
Standard Deviation	0.26	27	0.01	0.68	0.01	0.87	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Number of Guideline Exceedances	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table C: Soil Vapour Analytical Results

Project Number: 58037

Project Name: Caringbah Toyota




	Chlorinated Alkenes										Monocyclic Aromatic Hydrocarbons										Miscellaneous Hydrocarbons	
	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	1,2,4-trimethyl benzene	1,3,5-trimethyl benzene	4-isopropyl toluene	Isopropyl benzene	n-butyl benzene	n-propyl benzene	sec-butyl benzene	Styrene	Tert-butyl benzene	1,2-dibromoethane	Dibromomethane	
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.833333335	0.083333334	0.083333334	0.083333334	
NEPM 2013 Soil Vapour HSL A & HSL B - Sand 0 to <1m																						
NEPM 2013 Soil Vapour HSL D - Sand 0 to <1m																						
Field_ID	Sampled_Date-Time	Lab_Report_Number																				
VP01	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
VP04	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
VP07	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
VP09	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	0.8	0.3	<0.08333	0.4	<0.08333	0.3333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
VP11	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
VP14	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
VP16	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
VP19	28/01/2020	698996	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	0.3958	0.1417	<0.02083	0.2	<0.02083	0.1667	0.02917	<0.2083	<0.02083	<0.02083	<0.02083	
VP21	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
Statistical Summary																						
Number of Results	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
Number of Detects	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	2	1	0	0	0	0	
Minimum Concentration	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.08333	<0.08333	<0.02083	<0.08333	<0.02083	<0.08333	0.02917	<0.2083	<0.02083	<0.02083	<0.02083	
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3958	0.1417	ND	0.2	ND	0.1667	0.02917	ND	ND	ND	ND	
Maximum Concentration	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	0.8	0.3	<0.08333	0.4	<0.08333	0.3333	<0.08333	<0.8333	<0.08333	<0.08333	<0.08333	
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8	0.3	ND	0.4	ND	0.3333	0.02917	ND	ND	ND	ND	
Average Concentration	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.17	0.081	0.038	0.099	0.038	0.088	0.04	0.38	0.038	0.038	0.038	
Median Concentration	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.41665	0.041665	0.041665	0.041665	
Standard Deviation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.27	0.088	0.01	0.12	0.01	0.1	0.0042	0.1	0.01	0.01	0.01	
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Table C: Soil Vapour Analytical Results
Project Number: 58037
Project Name: Caringbah Toyota



	Chlorinated Benzenes						Trihalomethanes				Miscellaneous Industrial Chemicals	Organic Alcohols
	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Bromodichloromethane	Chloroform	Dibromochloromethane	Tribromomethane	Hexachlorobutadiene	Isopropyl alcohol
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	0.083333334	1.66666667
NEPM 2013 Soil Vapour HSL A & HSL B - Sand 0 to <1m												
NEPM 2013 Soil Vapour HSL D - Sand 0 to <1m												

Field_ID	Sampled_Date-Time	Lab_Report_Number											
VP01	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
VP04	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
VP07	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
VP09	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
VP11	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
VP14	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
VP16	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
VP19	28/01/2020	698996	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.4167
VP21	28/01/2020	698996	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667

Statistical Summary													
Number of Results	9	9	9	9	9	9	9	9	9	9	9	9	9
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.02083	<0.4167
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<0.08333	<1.667
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.76
Median Concentration	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.041665	0.8335
Standard Deviation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.21
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

LFG01 Continous Gas Monitoring Data (GasFlux Unit)																	
	Temperature (°C)	Relative Humidity (%)	Wind Speed (km/h)	Wind Gust (km/h)	Barometric Pressure (hPa)	Precipitation (mm)	Precipitation Today (mm)	Well Barometric Pressue (hPa)	Relative Humidity (%)	Steady State Flow Rate (L/hr)	CH4 (% v/v)	C02 (%v/v)	O2 (% v/v)	CO (ppm)	H2S (ppm)	(CH4) GSV	(CO2) GSV
Date / Time	Meterological Data							Monitoring Well Data									Continious GSV
4/9/2020 16:20	20	77	14.8	14.8	1024	0	1	1024.36	77	0	0.01	2.07	15.82	0	0.01	0	0
4/9/2020 17:23	20	82	11.1	11.1	1024	0	1	1024.36	82	0	0.01	2.09	15.8	0	0	0	0
4/9/2020 18:25	18.9	82	9.3	9.3	1024	0	2.4	1024.83	82	-0.03	0.01	2.11	15.75	0	0	0	0
4/9/2020 19:28	18.9	82	0	0	1024	0	2.7	1025.31	82	-0.04	0.02	2.04	15.78	0	0.01	0	0
4/9/2020 20:30	18.9	88	0	0	1025	0	2.7	1024.83	88	-0.01	0.01	2.1	15.64	0	0	0	0
4/9/2020 21:33	17.8	87	3.7	3.7	1024	0	2.4	1024.83	87	0.01	0.02	2.2	15.58	0	0.01	0	0
4/9/2020 22:35	17.2	93	0	0	1024	0	1.7	1024.36	93	-0.03	0.02	2.18	15.47	0	0.01	0	0
4/9/2020 23:38	17.2	93	0	0	1024	0	2.1	1023.88	93	0	0.03	2.2	15.4	0	0.01	0	0
4/10/2020 0:40	17.8	87	5.6	5.6	1023	0.3	2.3	1023.88	87	0.01	0.01	2.21	15.37	0	0.01	0	0
4/10/2020 1:43	17.8	87	0	0	1022	0	2.3	1022.93	87	0	0.01	2.3	15.34	0	0.01	0	0
4/10/2020 2:45	17.8	87	0	0	1022	0.3	2.5	1021.5	87	0	0.02	2.33	15.32	0	0.03	0	0
4/10/2020 3:48	17.8	87	9.3	9.3	1021	0.3	1.9	1021.5	87	0.01	0.01	2.33	15.3	0	0	0	0
4/10/2020 4:50	17.8	87	7.4	7.4	1021	0.3	1.7	1021.02	87	0.01	0.03	2.32	15.3	0	0.01	0	0
4/10/2020 5:53	17.8	87	7.4	7.4	1020	0.3	3.5	1020.55	87	-0.01	0.02	2.32	15.36	0	0.01	0	0
4/10/2020 6:55	17.8	93	7.4	7.4	1020	0.5	3.8	1021.02	93	-0.01	0.02	2.21	15.37	0	0	0	0
4/10/2020 7:57	18.9	88	9.3	9.3	1020	0.5	3.8	1020.55	88	-0.01	0.02	2.2	15.38	0	0.04	0	0
4/10/2020 9:00	18.9	88	14.8	14.8	1020	0.5	4.5	1020.07	88	0	0.01	2.32	15.35	0	0.01	0	0
4/10/2020 10:02	18.9	88	20.4	20.4	1019	0.5	0.5	1019.12	88	-0.01	0.02	2.33	15.35	0	0.01	0	0
4/10/2020 11:05	20	82	24.1	24.1	1018	0.5	3.8	1018.17	82	0.04	0.02	2.31	15.33	0	0	0	0
4/10/2020 12:07	20	82	20.4	20.4	1016	0.5	4	1016.74	82	0	0.02	2.23	15.37	0	0.01	0	0
4/10/2020 13:09	20	82	14.8	14.8	1014	0	4.3	1014.83	82	0.06	0.01	2.23	15.43	NaN	0.03	0	0
4/10/2020 14:12	22.8	68	18.5	18.5	1013	0	4.5	1012.93	68	0.02	0.01	2.26	15.41	NaN	0.02	0	0
4/10/2020 15:14	22.8	60	20.4	20.4	1012	0	4.2	1011.98	60	0.02	0.01	2.21	15.44	NaN	0.02	0	0
4/10/2020 16:17	22.8	60	22.2	22.2	1011	0	2.7	1011.5	60	-0.02	0.01	2.16	15.56	NaN	0.03	0	0
4/10/2020 17:19	20	63	42.6	42.6	1012	0	2.7	1012.45	63	0.14	0.01	2.06	15.72	NaN	0.01	0	0
4/10/2020 18:22	16.1	87	13	13	1012	0.3	11.7	1012.45	87	0.1	0.01	2.17	15.55	0	0	0	0
4/10/2020 19:24	17.2	87	9.3	9.3	1012	0	13.4	1011.98	87	-0.05	0.02	2.13	15.42	0	0.01	0	0
4/10/2020 20:27	16.1	87	14.8	14.8	1011	0	13.4	1011.98	87	0	0.02	2.24	15.36	0	0.03	0	0
4/10/2020 21:29	16.1	87	13	13	1011	0	18.2	1011.02	87	0.01	0.01	2.26	15.27	0	0.01	0	0
4/10/2020 22:32	16.1	87	20.4	20.4	1011	0	8.6	1010.55	87	0.02	0.02	2.26	15.19	0	0.05	0	0
4/10/2020 23:34	16.1	82	13	13	1009	0	13.4	1009.6	82	-0.02	0.02	2.34	15.15	0	0.01	0	0
4/11/2020 0:37	16.1	82	22.2	22.2	1009	0	13.4	1009.12	82	0.01	0.02	2.35	15.1	0	0.03	0	0
4/11/2020 1:39	15	87	25.9	25.9	1008	0	12.6	1008.17	87	0.03	0.04	2.36	15.09	0	0.01	0	0
4/11/2020 2:42	15	82	22.2	22.2	1007	0	11.8	1006.74	82	0	0.01	2.37	15.03	0	0.02	0	0
4/11/2020 3:44	15	82	18.5	18.5	1007	0	11.8	1006.74	82	-0.04	0.01	2.32	15.08	0	0.04	0	0
4/11/2020 4:47	15	82	16.7	16.7	1006	0	11.8	1006.74	82	0.01	0.01	2.36	15.1	0	0.03	0	0
4/11/2020 5:49	13.9	82	14.8	14.8	1006	0	11.8	1006.74	82	-0.07	0.02	2.33	15.07	0	0.02	0	0
4/11/2020 6:52	15.5	81	28.2	33.7	1010	0	11.8	1006.74	81	-0.05	0.01	2.37	15.05	0	0.01	0	0
4/11/2020 7:54	16.2	81	30.7	35	1010.9	0	11.1	1005.79	81	0	0.03	2.36	15.01	0	0.03	0	0
4/11/2020 8:56	17.7	73	33.5	38.6	1010.9	0	11.1	1005.31	73	0.04	0.02	2.37	15.12	0	0.05	0	0
4/11/2020 9:59	21.1	52	25.9	25.9	1005	0	11.1	1003.88	52	0.07	0.01	2.27	15.27	NaN	0.17	0	0
4/11/2020 11:01	22.8	40	33.3	33.3	1004	0	11.1	1002.45	40	-0.03	0.02	2.19	15.55	NaN	0.22	0	0
4/11/2020 12:03	25	38	33.3	33.3	1000	0	10.3	1000.55	38	0.13	0.07	2.09	15.79	NaN	0.21	0	0
4/11/2020 13:06	27.2	25	40.8	59.3	999	0	9.6	1000.07	25	0.07	0.07	1.99	15.89	NaN	0.1	0	0
4/11/2020 14:08	24.8	28	40.8	59.3	999	0	9.6	1000.55	28	-0.05	0.05	2	15.98	NaN	0.05	0	0
4/11/2020 15:11	25	27	53.7	72.2	1000	0	9.6	1000.55	27	0.19	0.06	2	15.97	NaN	0.01	0	0
4/11/2020 16:13	23.1	31	53.7	72.2	1002	0	7.2	1001.98	31	-0.03	0.06	2	15.94	NaN	0.04	0	0
4/11/2020 17:16	21.9	33	46.3	46.3	1001	0	4.8	1002.93	33	-0.05	0.03	2.12	15.85	NaN	0.06	0	0
4/11/2020 18:19	20	34	44.5	63	1004	0.3	2.4	1004.83	34	0.06	0.02	2.03	15.78	NaN	0.06	0	0

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

4/14/2020 22:22	17.8	87	7.4	7.4	1023	0	0	1023.88	87	-0.02	0.03	2.07	15.8	0	0.07	0	0
4/14/2020 23:25	17.8	87	9.3	9.3	1023	0	0	1023.88	87	-0.02	0.02	2.13	15.7	0	0.07	0	0
4/15/2020 0:27	17.2	93	3.7	3.7	1023	0	0	1023.4	93	-0.02	0.03	2.14	15.66	0	0.05	0	0
4/15/2020 1:30	17.2	93	0	0	1023	0	0	1022.93	93	-0.04	0.03	2.18	15.63	0	0.07	0	0
4/15/2020 2:32	17.2	87	9.3	9.3	1023	0	0	1022.93	87	0.01	0.02	2.23	15.55	0	0.05	0	0
4/15/2020 3:35	16.1	87	9.3	9.3	1023	0	0	1022.45	87	0	0.04	2.22	15.56	0	0.06	0	0
4/15/2020 4:37	16.1	87	11.1	11.1	1022	0	0	1022.93	87	-0.04	0.03	2.24	15.6	0	0.1	0	0
4/15/2020 5:40	16.1	87	11.1	11.1	1022	0	0	1022.45	87	-0.01	0.04	2.26	15.53	0	0.04	0	0
4/15/2020 6:42	16.1	87	11.1	11.1	1023	0	0	1022.93	87	-0.03	0.04	2.23	15.62	0	0.08	0	0
4/15/2020 7:44	17.8	77	11.1	11.1	1023	0	0	1023.88	77	-0.02	0.03	2.24	15.61	0	0.07	0	0
4/15/2020 8:46	18.9	72	14.8	14.8	1023	0	0	1022.93	72	0	0.04	2.24	15.62	0	0.18	0	0
4/15/2020 9:49	22.2	60	13	13	1023	0	0	1022.93	60	0	0.07	2.14	15.83	NaN	0.29	0	0
4/15/2020 10:51	23.9	53	13	13	1022	0	0	1021.98	53	0.02	0.07	2.06	16.04	NaN	0.35	0	0
4/15/2020 11:54	27.2	44	11.1	11.1	1021	0	0	1021.5	44	0.02	0.1	1.94	16.21	NaN	0.29	0	0
4/15/2020 12:56	27.8	41	14.8	14.8	1020	0	0	1020.07	41	0.04	0.08	1.84	16.33	NaN	0.19	0	0
4/15/2020 13:59	26.1	44	24.1	24.1	1019	0	0	1019.6	44	-0.02	0.08	1.84	16.41	NaN	0.1	0	0
4/15/2020 15:01	26.1	47	22.2	22.2	1018	0	0	1018.64	47	0	0.06	1.9	16.39	NaN	0.14	0	0
4/15/2020 16:04	25	53	27.8	27.8	1017	0	0	1017.69	53	0	0.07	1.97	16.29	NaN	0.03	0	0
4/15/2020 17:07	23.9	56	25.9	25.9	1017	0	0	1018.17	56	-0.01	0.03	2	16.18	NaN	0.12	0	0
4/15/2020 18:09	22.8	60	20.4	20.4	1017	0	0	1017.69	60	-0.02	0.03	2.06	16.08	NaN	0.06	0	0
4/15/2020 19:12	22.8	64	18.5	18.5	1017	0	0	1017.69	64	-0.03	0.02	2.09	16.04	NaN	0.1	0	0
4/15/2020 20:14	22.8	64	16.7	16.7	1017	0	0	1017.69	64	-0.03	0.02	2.07	15.93	NaN	0.07	0	0
4/15/2020 21:17	21.1	68	5.6	5.6	1017	0	0	1017.69	68	0.01	0.04	2.08	15.84	NaN	0.05	0	0
4/15/2020 22:20	21.1	72	1.9	1.9	1017	0	0	1016.74	72	-0.01	0.06	2.13	15.79	NaN	0.11	0	0
4/15/2020 23:22	20	77	5.6	5.6	1016	0	0	1015.79	77	0.01	0.03	2.15	15.72	0	0.08	0	0
4/16/2020 0:25	20	72	1.9	1.9	1015	0	0	1015.31	72	0	0.04	2.15	15.66	0	0.07	0	0
4/16/2020 1:27	18.9	72	0	0	1015	0	0	1014.36	72	0	0.05	2.17	15.64	0	0.07	0	0
4/16/2020 2:30	18.9	77	0	0	1014	0	0	1013.88	77	-0.02	0.02	2.27	15.61	0	0.12	0	0
4/16/2020 3:32	17.8	82	11.1	11.1	1013	0	0	1013.4	82	-0.02	0.06	2.17	15.56	0	0.07	0	0
4/16/2020 4:35	18.9	77	13	13	1013	0	0	1013.88	77	-0.07	0.04	2.24	15.6	0	0.06	0	0
4/16/2020 5:37	17.8	77	11.1	11.1	1014	0	0	1013.88	77	0.01	0.04	2.23	15.61	0	0.07	0	0
4/16/2020 6:39	18.9	72	11.1	11.1	1014	0	0	1014.36	72	-0.03	0.06	2.26	15.57	0	0.07	0	0
4/16/2020 7:42	20	68	13	13	1014	0	0	1013.88	68	-0.03	0.04	2.26	15.57	0	0.07	0	0
4/16/2020 8:44	22.2	60	13	13	1013	0	0	1013.88	60	-0.03	0.04	2.16	15.62	0	0.07	0	0
4/16/2020 9:47	23.9	49	14.8	14.8	1013	0	0	1013.4	49	0.01	0.03	2.25	15.63	0	0.21	0	0
4/16/2020 10:49	25	50	22.2	22.2	1012	0	0	1012.45	50	0.01	0.07	2.26	15.64	0	0.14	0	0
4/16/2020 11:51	27.2	41	22.2	22.2	1011	0	0	1011.02	41	0.07	0.04	2.18	15.75	0	0.14	0	0
4/16/2020 12:54	27.2	41	24.1	24.1	1010	0	0	1010.07	41	0.01	0.03	2.1	15.78	0	0.13	0	0
4/16/2020 13:56	27.2	38	16.7	16.7	1009	0	0	1009.6	38	-0.05	0.03	2.11	15.86	0	0.18	0	0
4/16/2020 14:59	26.1	44	18.5	18.5	1009	0	0	1009.6	44	-0.05	0.03	2.12	15.91	NaN	0.11	0	0
4/16/2020 16:01	27.2	41	16.7	16.7	1009	0	0.5	1008.64	41	0	0.04	2.12	15.92	0	0.09	0	0
4/16/2020 17:04	26.1	41	25.9	25.9	1008	0	0.3	1008.64	41	-0.03	0.04	2.11	15.97	0	0.1	0	0
4/16/2020 18:06	26.1	41	18.5	18.5	1009	0	0	1009.6	41	-0.03	0.05	2.12	15.95	0	0.16	0	0
4/16/2020 19:09	25	43	18.5	18.5	1009	0	0	1009.6	43	0	0.03	2.11	15.95	0	0.1	0	0
4/16/2020 20:11	25	43	18.5	18.5	1009	0	0	1009.6	43	0	0.06	2.1	15.87	0	0.06	0	0
4/16/2020 21:14	25	41	18.5	18.5	1009	0	0	1009.12	41	-0.03	0.04	2.17	15.8	0	0.12	0	0
4/16/2020 22:16	25	41	24.1	24.1	1009	0	0	1009.12	41	-0.04	0.06	2.18	15.78	0	0.09	0	0
4/16/2020 23:19	23.9	46	18.5	18.5	1008	0	0	1009.12	46	-0.04	0.04	2.16	15.72	0	0.06	0	0
4/17/2020 0:21	22.8	49	16.7	16.7	1008	0	0	1008.64	49	0	0.06	2.18	15.73	0	0.04	0	0
4/17/2020 1:24	22.2	52	11.1	11.1	1008	0	0	1009.6	52	-0.01	0.07	2.09	15.82	0	0.08	0	0
4/17/2020 2:26	18.9	88	29.6	29.6	1009	0	0	1009.12	88	-0.01	0.07	2.18	15.74	0	0.08	0	0
4/17/2020 3:29	18.9	93	24.1	24.1	1009	0	0	1009.6	93	-0.04	0.06	2.1	15.75	0	0.09	0	0
4/17/2020 4:31	18.9	88	22.2	22.2	1009	0	0	1009.6	88	-0.11	0.04	2.15	15.81	0	0.06	0	0
4/17/2020 5:33	18.9	88	13	13	1010	0	0	1009.6	88	-0.05	0.06	2.17	15.73	0	0.08	0	0
4/17/2020 6:36	17.8	93	1.9	1.9	1010	0	0	1010.55	93	-0.02	0.07	2.13	15.79	0	0.1	0	0
4/17/2020 7:38	20	45	29.6	29.6	1011	0	0	1011.5	45	0.01	0.03	2.1	15.78	0	0.1	0	0
4/17/2020 8:40	21.1	40	31.5	31.5	1011	0	0	1011.02	40	0	0.07	2.16	15.72	0	0.21	0	0
4/17/2020 9:42	22.2	37	25.9	25.9	1011	0	0	1011.02	37	0.04	0.09	2.09	15.88	NaN	0.26	0	0
4/17/2020 10:45	22.8	30	27.8	27.8	1011	0	0	1011.02	30	0.04	0.12	2	16.21	NaN	0.26	0	0
4/17/2020 11:47	25	29	22.2	22.2	1010	0	0	1010.55	29	0.05	0.11	1.89	16.3	NaN	0.16	0	0
4/17/2020 12:50	26.1	23	24.1	24.1	1009	0	0	1009.6	23	0.05	0.08	1.89	16.41	NaN	0.16	0	0
4/17/2020 13:52	27.2	19	25.9	25.9	1009	0	0	1009.12	19	-0.01	0.09	1.79	16.51	NaN	0.14	0	0
4/17/2020 14:55	26.1	20	31.5	31.5	1008	0	0	1009.12	20	0.02	0.08	1.88	16.55	NaN	0.06	0	0
4/17/2020 15:58	26.1	15	25.9	25.9	1008	0	0	1009.12	15	0	0.08	1.89	16.52	NaN	0.11	0	0
4/17/2020 17:00	26.1	13	22.2	22.2	1009	0	0	1009.6	13	0	0.06	1.9	16.45	NaN	0.05	0	0
4/17/2020 18:03	23.9	17	25.9	25.9	1009	0	0	1010.07	17	-0.02	0.04	1.93	16.38	NaN	0.12	0	0
4/17/2020 19:06	22.2	19	20.4	20.4	1010	0	0	1010.55	19	-0.01	0.02	1.97	16.23	NaN	0.07	0	0
4/17/2020 20:08	21.1	19	18.5	18.5	1011	0	0	1011.02	19	-0.03	0.03	2.01	16.2	NaN	0.07	0	0
4/17/2020 21:11	18.9	25	9.3	9.3	1011	0	0	1011.98	25	-0.02	0.04	1.99	16.17	NaN	0.1	0	0
4/17/2020 22:13	17.8	29	11.1	11.1	1012	0	0	1012.45	29	0	0.05	1.99	16.08	0	0.08	0	0
4/17/2020 23:16	17.2	33	24.1	24.1	1012	0	0	1011.98	33	-0.03	0.04	2.09	15.87	0	0.05	0	0
4/18/2020 0:18	16.1	47	14.8	14.8	1012	0	0	1012.45	47	-0.01	0.04	2.19	15.79	0	0.06	0	0
4/18/2020 1:21	16.1	44	24.1	24.1	1012	0	0	1011.98	44	0.01	0.04	2.26	15.7	0	0.06	0	0
4/18/2020 2:23	15	51	22.2	22.2	1012	0	0	1011.5	51	0.01	0.04	2.29	15.61	0	0.1	0	0
4/18/2020 3:26	15	54	18.5	18.5	1011	0	0	1011.5	54	-0.01	0.06	2.29	15.61	0	0.04	0	0
4/18/2020 4:28	13.9	58	22.2	22.2	1011	0	0	1011.5	58	-0.03	0.06	2.18	15.64	0	0.07	0	0
4/18/2020 5:31	15	54	24.1	24.1	1011	0	0	1011.98	54	-0.03	0.06	2.18	15.67	0	0.04	0	0
4/18/2020 6:33	13.9	58	22.2														

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

4/20/2020 12:43	18.9	63	11.1	11.1	1014	0	0	1013.88	63	0	0.07	2.16	15.9	0	0.11	0	0
4/20/2020 13:45	21.1	49	18.5	18.5	1012	0	0	1012.45	49	0.03	0.08	2.15	15.89	0	0.15	0	0
4/20/2020 14:48	21.1	42	25.9	25.9	1012	0	0	1012.45	42	0.02	0.07	2.15	15.98	0	0.14	0	0
4/20/2020 15:50	20	45	13	13	1012	0	0	1012.45	45	0.03	0.06	2.15	16.01	0	0.1	0	0
4/20/2020 16:53	20	45	13	13	1012	0	0	1012.93	45	-0.1	0.07	2.09	16.04	0	0.03	0	0
4/20/2020 17:55	18.9	52	11.1	11.1	1013	0	0	1013.88	52	-0.09	0.07	2.08	16.07	0	0.1	0	0
4/20/2020 18:58	18.9	52	14.8	14.8	1014	0	0	1015.31	52	-0.01	0.08	2.16	16.07	0	0.07	0	0
4/20/2020 20:00	18.9	55	22.2	22.2	1015	0	0	1015.79	55	-0.04	0.07	2.08	16.01	0	0.07	0	0
4/20/2020 21:03	17.8	59	22.2	22.2	1016	0	0	1016.26	59	0.02	0.06	2.15	15.99	0	0.07	0	0
4/20/2020 22:05	17.8	63	16.7	16.7	1016	0	0	1016.74	63	0	0.07	2.15	15.97	0	0.05	0	0
4/20/2020 23:08	17.2	67	14.8	14.8	1016	0	0	1016.74	67	0	0.08	2.17	15.91	0	0.08	0	0
4/21/2020 0:10	16.1	72	11.1	11.1	1016	0	0	1016.74	72	-0.06	0.07	2.16	15.91	0	0.09	0	0
4/21/2020 1:13	16.1	72	18.5	18.5	1016	0	0	1017.21	72	-0.02	0.07	2.15	15.92	0	0.08	0	0
4/21/2020 2:15	16.1	72	20.4	20.4	1017	0	0	1016.74	72	0.03	0.07	2.15	15.89	0	0.1	0	0
4/21/2020 3:17	16.1	67	16.7	16.7	1016	0	0	1016.74	67	-0.03	0.06	2.24	15.87	0	0.08	0	0
4/21/2020 4:20	15	71	14.8	14.8	1016	0	0	1017.21	71	-0.05	0.07	2.16	15.87	0	0.07	0	0
4/21/2020 5:22	15	71	13	13	1017	0	0	1017.21	71	-0.05	0.07	2.23	15.83	0	0.04	0	0
4/21/2020 6:25	16.1	67	7.4	7.4	1017	0	0	1017.69	67	0	0.06	2.21	15.83	0	0.07	0	0
4/21/2020 7:27	16.1	63	13	13	1018	0	0	1018.64	63	-0.02	0.06	2.15	15.86	0	0.12	0	0
4/21/2020 8:30	17.8	59	9.3	9.3	1019	0	0	1019.12	59	-0.01	0.08	2.16	15.85	0	0.16	0	0
4/21/2020 9:32	20	52	11.1	11.1	1019	0	0	1019.12	52	-0.02	0.14	2.1	16.05	0	0.27	0	0
4/21/2020 10:34	22.2	43	7.4	7.4	1018	0	0	1018.64	43	-0.01	0.23	2.06	16.18	0	0.08	0	0
4/21/2020 11:36	22.8	40	7.4	7.4	1018	0	0	1017.69	40	0.03	0.15	1.97	16.47	NaN	0.04	0	0
4/21/2020 12:39	23.9	35	11.1	11.1	1016	0	0	1016.26	35	0.02	0.11	1.87	16.61	NaN	0.11	0	0
4/21/2020 13:41	25	31	5.6	5.6	1015	0	0	1015.31	31	-0.03	0.08	1.86	16.69	NaN	0.06	0	0
4/21/2020 14:44	23.9	43	24.1	24.1	1014	0	0	1015.31	43	-0.02	0.07	1.84	16.77	NaN	0.02	0	0
4/21/2020 15:47	23.9	43	24.1	24.1	1014	0	0	1014.83	43	-0.01	0.08	1.9	16.7	0	0.04	0	0
4/21/2020 16:49	22.2	52	25.9	25.9	1014	0	0	1014.36	52	-0.02	0.04	1.91	16.57	0	0.04	0	0
4/21/2020 17:52	22.2	56	24.1	24.1	1014	0	0	1014.83	56	-0.03	0.04	2	16.48	0	0.05	0	0
4/21/2020 18:55	22.2	60	20.4	20.4	1015	0	0	1015.31	60	0	0.04	1.97	16.41	0	0.09	0	0
4/21/2020 19:57	22.2	60	22.2	22.2	1015	0	0	1015.31	60	-0.01	0.04	2	16.31	0	0.04	0	0
4/21/2020 21:00	21.1	59	16.7	16.7	1015	0	0	1015.79	59	-0.05	0.05	2.08	16.29	0	0.08	0	0
4/21/2020 22:02	20	63	11.1	11.1	1016	0	0	1016.26	63	-0.04	0.07	2.07	16.24	0	0.11	0	0
4/21/2020 23:05	18.9	67	9.3	9.3	1016	0	0	1016.26	67	0	0.07	2.07	16.14	0	0.07	0	0
4/22/2020 0:07	18.9	63	0	0	1016	0	0	1016.26	63	0	0.08	2.14	16.07	0	0.06	0	0
4/22/2020 1:10	17.2	77	13	13	1016	0	0	1016.26	77	-0.02	0.07	2.16	16.04	0	0.07	0	0
4/22/2020 2:12	16.1	82	11.1	11.1	1015	0	0	1015.79	82	-0.05	0.07	2.22	15.98	0	0.07	0	0
4/22/2020 3:15	16.1	77	16.7	16.7	1015	0	0	1015.79	77	-0.04	0.04	2.16	15.97	0	0.07	0	0
4/22/2020 4:17	16.1	72	14.8	14.8	1015	0	0	1016.26	72	-0.01	0.06	2.17	15.92	0	0.08	0	0
4/22/2020 5:20	16.1	72	13	13	1016	0	0	1016.26	72	-0.05	0.06	2.15	15.94	0	0.05	0	0
4/22/2020 6:22	15	71	9.3	9.3	1016	0	0	1017.21	71	-0.05	0.06	2.14	15.93	0	0.05	0	0
4/22/2020 7:25	15	76	14.8	14.8	1017	0	0	1017.69	76	-0.04	0.06	2.15	15.92	0	0.05	0	0
4/22/2020 8:27	17.2	67	14.8	14.8	1018	0	0	1018.64	67	-0.01	0.08	2.16	15.97	0	0.14	0	0
4/22/2020 9:29	20	48	27.8	27.8	1019	0	0	1018.64	48	0.03	0.12	2.14	16.17	0	0.22	0	0
4/22/2020 10:32	22.2	43	22.2	22.2	1018	0	0	1018.64	43	0.01	0.23	2.02	16.37	NaN	0.12	0	0
4/22/2020 11:34	22.8	40	16.7	16.7	1018	0	0	1018.64	40	0.04	0.16	1.91	16.53	NaN	0.04	0	0
4/22/2020 12:37	23.9	33	20.4	20.4	1017	0	0	1017.69	33	0.02	0.12	1.87	16.68	NaN	0.06	0	0
4/22/2020 13:39	25	31	11.1	11.1	1016	0	0	1016.74	31	0.07	0.1	1.86	16.76	NaN	0.03	0	0
4/22/2020 14:42	25	38	16.7	16.7	1016	0	0	1017.21	38	-0.03	0.09	1.84	16.84	NaN	0.03	0	0
4/22/2020 15:45	22.8	46	14.8	14.8	1016	0	0	1016.74	46	-0.01	0.09	1.91	16.82	NaN	0.01	0	0
4/22/2020 16:47	22.2	49	14.8	14.8	1016	0	0	1017.21	49	0	0.06	1.94	16.69	0	0.03	0	0
4/22/2020 17:50	21.1	52	11.1	11.1	1017	0	0	1017.69	52	-0.03	0.02	1.92	16.59	0	0.06	0	0
4/22/2020 18:53	20	55	3.7	3.7	1017	0	0	1018.17	55	-0.02	0.05	1.96	16.51	0	0.03	0	0
4/22/2020 19:55	18.9	59	5.6	5.6	1018	0	0	1018.64	59	-0.03	0.04	2	16.43	0	0.07	0	0
4/22/2020 20:58	17.8	67	5.6	5.6	1018	0	0	1019.12	67	-0.02	0.07	1.97	16.38	0	0.03	0	0
4/22/2020 22:00	17.8	67	1.9	1.9	1019	0	0	1019.6	67	-0.04	0.05	2.06	16.31	0	0.04	0	0
4/22/2020 23:03	16.1	77	0	0	1019	0	0	1019.12	77	-0.01	0.06	2.08	16.1	0	0.03	0	0
4/23/2020 0:05	16.1	82	11.1	11.1	1019	0	0	1019.12	82	0	0.06	2.07	16.05	0	0.04	0	0
4/23/2020 1:08	16.1	77	0	0	1019	0	0	1019.12	77	-0.05	0.05	2.15	16	0	0.03	0	0
4/23/2020 2:10	15	82	9.3	9.3	1019	0	0	1019.6	82	-0.01	0.05	2.13	15.98	0	0.04	0	0
4/23/2020 3:13	13.9	76	13	13	1019	0	0	1019.12	76	-0.04	0.05	2.14	15.9	0	0.02	0	0
4/23/2020 4:15	13.9	76	13	13	1019	0	0	1019.6	76	-0.02	0.07	2.17	15.92	0	0.05	0	0
4/23/2020 5:18	13.9	67	9.3	9.3	1020	0	0	1020.07	67	-0.05	0.07	2.16	15.92	0	0.04	0	0
4/23/2020 6:20	15	62	14.8	14.8	1020	0	0	1020.07	62	-0.07	0.07	2.14	15.91	0	0.07	0	0
4/23/2020 7:23	15	62	13	13	1020	0	0	1020.55	62	-0.08	0.06	2.14	15.98	0	0.07	0	0
4/23/2020 8:25	17.2	55	11.1	11.1	1021	0	0	1021.02	55	0	0.1	2.14	15.95	0	0.1	0	0
4/23/2020 9:27	18.9	48	14.8	14.8	1021	0	0	1021.02	48	-0.01	0.12	2.11	16.08	0	0.24	0	0
4/23/2020 10:30	21.1	45	16.7	16.7	1020	0	0	1020.55	45	0.02	0.22	2.02	16.3	NaN	0.05	0	0
4/23/2020 11:32	22.8	37	16.7	16.7	1020	0	0	1019.6	37	0	0.15	1.89	16.53	NaN	0	0	0
4/23/2020 12:35	23.9	29	14.8	14.8	1019	0	0	1018.64	29	0.05	0.1	1.86	16.69	NaN	0.07	0	0
4/23/2020 13:37	25	27	14.8	14.8	1017	0	0	1017.21	27	0.02	0.08	1.76	16.83	NaN	0.06	0	0
4/23/2020 14:40	25	25	16.7	16.7	1016	0	0	1016.26	25	0.03	0.1	1.77	16.87	NaN	0.01	0	0
4/23/2020 15:43	23.9	40	22.2	22.2	1016	0	0	1015.79	40	0.01	0.09	1.89	16.85	NaN	0.01	0	0
4/23/2020 16:45	22.2	49	24.1	24.1	1015	0	0	1015.79	49	0.01	0.04	1.91	16.75	0	0.04	0	0
4/23/2020 17:48	22.2	52	20.4	20.4	1016	0	0	1016.26	52	-0.01	0.04	1.93	16.67	0	0.04	0	0
4/23/2020 18:50	21.1	56	16.7	16.7	1016	0	0	1016.26	56	-0.01	0.05	1.98	16.59	0	0.06	0	0
4/23/2020 19:53	21.1	52	13	13	1016	0	0	1017.21	52	-0.03	0.06	1.96	16.49	0	0.02	0	0
4/23/2020 20:56	20	55	9.3														

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

4/26/2020 2:04	17.2	72	11.1	11.1	1016	0	0	1015.79	72	0	0.07	2.17	16.14	0	0.08	0	0
4/26/2020 3:06	16.1	77	13	13	1014	0	0	1014.83	77	-0.06	0.06	2.17	16.08	0	0.03	0	0
4/26/2020 4:09	16.1	72	9.3	9.3	1014	0	0	1013.88	72	-0.02	0.06	2.15	16.02	0	0.06	0	0
4/26/2020 5:11	15	76	11.1	11.1	1014	0	0	1013.88	76	-0.09	0.07	2.16	16.03	0	0.06	0	0
4/26/2020 6:14	15	82	11.1	11.1	1013	0	0	1013.88	82	-0.03	0.07	2.18	16.04	0	0.06	0	0
4/26/2020 7:16	15	82	7.4	7.4	1014	0	0	1014.83	82	0	0.07	2.16	16.02	0	0.07	0	0
4/26/2020 8:18	17.8	63	11.1	11.1	1015	0	0	1014.83	63	-0.04	0.09	2.18	16.02	0	0.07	0	0
4/26/2020 9:20	20	52	16.7	16.7	1015	0	0	1014.83	52	0.01	0.12	2.18	16.13	0	0.21	0	0
4/26/2020 10:23	25	35	20.4	20.4	1014	0	0	1013.88	35	0.07	0.19	2.1	16.25	NaN	0.09	0	0
4/26/2020 11:25	27.2	34	20.4	20.4	1013	0	0	1012.93	34	0.03	0.24	2.02	16.42	NaN	0.07	0	0
4/26/2020 12:28	27.2	31	25.9	25.9	1012	0	0	1012.45	31	0.03	0.19	1.92	16.67	NaN	0.05	0	0
4/26/2020 13:30	27.2	29	37	37	1012	0	0	1011.98	29	-0.01	0.12	1.91	16.8	NaN	0.1	0	0
4/26/2020 14:33	27.2	29	24.1	24.1	1011	0	0	1012.45	29	-0.01	0.08	1.89	16.8	NaN	0.05	0	0
4/26/2020 15:36	26.1	31	20.4	20.4	1012	0	0	1012.93	31	-0.06	0.08	1.92	16.79	NaN	0.1	0	0
4/26/2020 16:38	25	35	25.9	25.9	1013	0.5	0.5	1013.88	35	-0.04	0.07	1.93	16.77	NaN	0.11	0	0
4/26/2020 17:41	23.9	43	20.4	20.4	1014	0	0	1014.83	43	-0.09	0.05	1.93	16.73	NaN	0.03	0	0
4/26/2020 18:43	22.2	56	33.3	33.3	1015	0	0	1016.26	56	-0.03	0.05	1.91	16.67	0	0.1	0	0
4/26/2020 19:46	21.1	56	25.9	25.9	1017	0	0	1016.74	56	0	0.06	1.97	16.61	0	0.09	0	0
4/26/2020 20:48	20	55	24.1	24.1	1017	0	0	1017.69	55	-0.05	0.08	1.98	16.57	0	0.06	0	0
4/26/2020 21:51	18.9	55	16.7	16.7	1018	0	0	1019.12	55	-0.02	0.1	1.97	16.56	0	0.07	0	0
4/26/2020 22:53	17.8	59	11.1	11.1	1019	0	0	1019.6	59	-0.01	0.07	1.96	16.45	0	0.06	0	0
4/26/2020 23:56	18.9	59	22.2	22.2	1019	0	0	1020.07	59	-0.04	0.08	2.06	16.4	0	0.12	0	0
4/27/2020 0:58	17.8	67	18.5	18.5	1020	0.3	0.3	1021.02	67	-0.04	0.1	2.06	16.38	0	0.07	0	0
4/27/2020 2:01	17.8	67	13	13	1020	0.3	0.3	1021.02	67	-0.06	0.09	2.13	16.34	0	0.05	0	0
4/27/2020 3:03	18.9	82	16.7	16.7	1020	0.3	0.3	1021.02	82	-0.03	0.1	2.13	16.28	0	0.13	0	0
4/27/2020 4:06	17.8	82	14.8	14.8	1021	0.3	0.3	1021.02	82	-0.02	0.09	2.06	16.32	0	0.09	0	0
4/27/2020 5:08	17.2	87	14.8	14.8	1021	0.3	0.3	1021.5	87	-0.03	0.09	2.08	16.31	0	0.08	0	0
4/27/2020 6:11	17.2	87	13	13	1022	0	0.7	1022.45	87	-0.04	0.08	2.07	16.34	0	0.1	0	0
4/27/2020 7:13	17.2	87	13	13	1022	0	0.5	1022.45	87	-0.03	0.08	2.15	16.32	0	0.06	0	0
4/27/2020 8:16	17.8	82	13	13	1023	0	0.5	1023.88	82	-0.04	0.1	2.06	16.35	0	0.1	0	0
4/27/2020 9:18	18.9	77	13	13	1024	0	0	1023.88	77	-0.01	0.12	2.1	16.36	0	0.14	0	0
4/27/2020 10:20	18.9	82	13	13	1023	0	0	1023.88	82	0	0.13	2.06	16.48	0	0.13	0	0
4/27/2020 11:22	20	72	13	13	1023	0	0.5	1023.88	72	-0.02	0.12	2.04	16.6	0	0.11	0	0
4/27/2020 12:25	20	72	13	13	1023	0	1.9	1022.93	72	-0.02	0.1	2.01	16.69	0	0.13	0	0
4/27/2020 13:27	20	77	16.7	16.7	1022	0	1.9	1022.93	77	-0.03	0.08	1.99	16.63	0	0.04	0	0
4/27/2020 14:30	20	77	14.8	14.8	1022	0.3	2.2	1022.93	77	-0.03	0.08	1.98	16.67	0	0.07	0	0
4/27/2020 15:32	20	82	13	13	1023	0	1	1023.4	82	-0.02	0.07	1.97	16.67	0	0.09	0	0
4/27/2020 16:34	21.1	64	11.1	11.1	1023	0	1	1022.93	64	-0.01	0.07	1.96	16.65	0	0.04	0	0
4/27/2020 17:37	20	72	9.3	9.3	1023	0	1.9	1023.88	72	-0.02	0.08	1.97	16.66	0	0.05	0	0
4/27/2020 18:40	20	68	11.1	11.1	1024	0.3	1.9	1024.36	68	-0.01	0.08	1.96	16.59	0	0.04	0	0
4/27/2020 19:42	21.1	68	18.5	18.5	1024	0.3	2.2	1024.36	68	-0.02	0.07	1.95	16.57	0	0.1	0	0
4/27/2020 20:45	20	77	20.4	20.4	1024	0.3	2.2	1024.83	77	-0.06	0.1	2.04	16.52	0	0.06	0	0
4/27/2020 21:47	20	72	16.7	16.7	1025	0.3	2.2	1025.31	72	-0.03	0.1	2.04	16.5	0	0.06	0	0
4/27/2020 22:50	20	72	16.7	16.7	1025	0.3	2.2	1025.31	72	-0.01	0.1	2.05	16.49	0	0.06	0	0
4/27/2020 23:52	20	72	24.1	24.1	1024	0	2.2	1024.83	72	-0.04	0.11	2.06	16.46	0	0.1	0	0
4/28/2020 0:54	20	68	22.2	22.2	1024	0.3	1.9	1024.36	68	-0.04	0.11	2.06	16.44	0	0.11	0	0
4/28/2020 1:57	20	72	16.7	16.7	1024	0.3	2.2	1023.88	72	0.03	0.1	2.06	16.44	0	0.13	0	0
4/28/2020 2:59	20	68	22.2	22.2	1023	0	2.2	1023.88	68	0.01	0.1	2.06	16.43	0	0.07	0	0
4/28/2020 4:02	20	68	20.4	20.4	1023	0	1.9	1023.88	68	-0.01	0.11	2.06	16.44	0	0.1	0	0
4/28/2020 5:04	21.1	64	18.5	18.5	1023	0	1.4	1023.88	64	0.02	0.11	2.06	16.45	0	0.05	0	0
4/28/2020 6:07	21.1	64	18.5	18.5	1024	0	1.4	1024.36	64	-0.02	0.1	2.05	16.45	0	0.11	0	0
4/28/2020 7:09	20	72	14.8	14.8	1024	0	1.4	1024.36	72	-0.03	0.1	2	16.45	0	0.06	0	0
4/28/2020 8:12	22.2	60	20.4	20.4	1024	0	1.4	1024.83	60	-0.03	0.11	2.06	16.49	0	0.1	0	0
4/28/2020 9:14	22.2	56	22.2	22.2	1024	0	0.5	1024.83	56	0	0.11	2.05	16.51	0	0.11	0	0
4/28/2020 10:16	22.2	56	20.4	20.4	1024	0	0.3	1024.36	56	-0.01	0.12	1.96	16.53	0	0.14	0	0
4/28/2020 11:19	23.9	46	25.9	25.9	1024	0	0.9	1023.88	46	-0.02	0.14	2.07	16.53	0	0.12	0	0
4/28/2020 12:21	22.8	52	29.6	29.6	1023	0	2	1022.45	52	0.02	0.11	1.97	16.59	0	0.19	0	0
4/28/2020 13:24	22.8	56	24.1	24.1	1022	0	3.6	1021.98	56	0.02	0.12	1.97	16.6	0	0.07	0	0
4/28/2020 14:26	22.8	60	25.9	25.9	1021	0	3.6	1021.5	60	0.01	0.1	1.99	16.64	0	0.13	0	0
4/28/2020 15:29	22.2	60	27.8	27.8	1021	0	0.5	1021.5	60	-0.01	0.09	1.97	16.65	0	0.09	0	0
4/28/2020 16:31	22.2	60	27.8	27.8	1021	0	1.7	1021.02	60	-0.01	0.1	1.98	16.65	0	0.08	0	0
4/28/2020 17:34	21.1	72	22.2	22.2	1020	0	4.2	1021.02	72	-0.01	0.08	1.98	16.6	0	0.07	0	0
4/28/2020 18:36	22.2	64	16.7	16.7	1020	0	4.2	1021.5	64	-0.03	0.11	1.96	16.59	0	0.11	0	0
4/28/2020 19:39	22.2	68	9.3	9.3	1021	0	4.2	1021.02	68	-0.02	0.1	1.95	16.59	0	0.11	0	0
4/28/2020 20:41	20	88	5.6	5.6	1021	0.3	7.2	1021.02	88	-0.03	0.1	1.97	16.54	0	0.04	0	0
4/28/2020 21:44	20	88	5.6	5.6	1020	0	7.2	1020.55	88	0.02	0.1	2.06	16.46	0	0.08	0	0
4/28/2020 22:46	20	88	13	13	1020	0	4.2	1020.07	88	0	0.11	2.07	16.43	0	0.09	0	0
4/28/2020 23:49	18.9	88	9.3	9.3	1019	0	4.6	1019.12	88	-0.02	0.11	2.08	16.38	0	0.04	0	0
4/29/2020 0:51	18.9	88	9.3	9.3	1018	0	4.6	1018.17	88	0	0.11	2.07	16.36	0	0.07	0	0
4/29/2020 1:54	18.9	88	13	13	1018	0	4.6	1017.69	88	0	0.11	2.07	16.36	0	0.15	0	0
4/29/2020 2:56	17.8	93	11.1	11.1	1017	0	4.6	1017.21	93	0.01	0.12	2.08	16.33	0	0.07	0	0
4/29/2020 3:59	18.9	88	16.7	16.7	1016	0	4.6	1016.74	88	-0.04	0.12	2.09	16.34	0	0.05	0	0
4/29/2020 5:01	17.8	93	18.5	18.5	1016	0	4.6	1016.26	93	0	0.1	2.07	16.36	0	0.1	0	0
4/29/2020 6:03	17.8	87	11.1	11.1	1016	0	4.1	1016.26	87	0.04	0.11	2.07	16.35	0	0.08	0	0
4/29/2020 7:06	18.9	88	13	13	1016	0	4.1	1016.26	88	-0.05	0.11	1.99	16.41	0	0.11	0	0
4/29/2020 8:08	20	82	16.7	16.7	1016	0	4.1	1016.26	82	-0.04	0.12	2.09	16.4	0	0.09	0	0
4/29/2020 9:10	21.1	72	14.8	14.8	1016	0	4.1	1015.79									

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

5/1/2020 2:51	11.1	66	16.7	16.7	1007	0	6.9	1007.69	66	-0.04	0.11	2.2	15.84	0	0.04	0	0
5/1/2020 3:53	11.1	61	16.7	16.7	1007	0	6.9	1008.17	61	-0.05	0.09	2.3	16.07	0	0.05	0	0
5/1/2020 4:56	11.1	66	18.5	18.5	1008	0	6.9	1008.17	66	-0.03	0.11	2.19	15.81	0	0.01	0	0
5/1/2020 5:58	10	71	14.8	14.8	1007	0	6.9	1007.69	71	-0.04	0.11	2.29	15.76	0	0.03	0	0
5/1/2020 7:00	12.2	57	20.4	20.4	1008	0	6.9	1008.64	57	-0.04	0.11	2.2	15.83	0	0.05	0	0
5/1/2020 8:03	13.9	50	20.4	20.4	1009	0	6.9	1008.64	50	-0.01	0.12	2.19	15.83	0	0.04	0	0
5/1/2020 9:05	15	41	29.6	48.2	1009	0	6.1	1008.17	41	-0.09	0.17	2.19	15.91	0	0.08	0	0
5/1/2020 10:07	16.1	38	38.9	38.9	1008	0	22.1	1008.17	38	0	0.25	2.03	16.08	0	0.02	0	0
5/1/2020 11:10	16.1	36	42.6	61.1	1007	0	4.4	1007.69	36	0.03	0.29	1.95	16.21	0	0.11	0	0
5/1/2020 12:12	17.2	33	48.2	48.2	1007	0	4.4	1007.21	33	0.18	0.28	1.95	16.27	0	0.02	0	0
5/1/2020 13:14	17.2	29	33.3	51.9	1006	0	3.6	1006.74	29	0.08	0.15	1.95	16.37	0	0	0	0
5/1/2020 14:17	17.2	33	40.8	40.8	1006	0	2.7	1006.26	33	0.01	0.03	1.58	16.7	0	0	0	0
5/1/2020 15:20	17.2	31	46.3	46.3	1005	0	1.8	1006.26	31	0.04	0.01	1.72	16.59	0	0	0	0
5/1/2020 16:22	16.1	31	40.8	59.3	1006	0	0.9	1006.74	31	0.17	0.03	1.8	16.42	0	0	0	0
5/1/2020 17:25	16.1	33	35.2	35.2	1006	0	0	1006.74	33	-0.02	0.04	1.9	16.3	0	0	0	0
5/1/2020 18:27	15	38	31.5	31.5	1007	0	0	1007.69	38	-0.08	0.04	1.89	16.22	0	0.01	0	0
5/1/2020 19:30	13.9	44	24.1	24.1	1007	0	0	1007.21	44	-0.1	0.03	1.99	16.09	0	0	0	0
5/1/2020 20:32	13.9	47	29.6	29.6	1007	0	0	1006.26	47	-0.04	0.03	2.05	16.01	0	0	0	0
5/1/2020 21:35	13.9	47	31.5	31.5	1006	0	0	1005.31	47	-0.05	0.04	2.04	15.94	0	0	0	0
5/1/2020 22:37	12.8	54	35.2	35.2	1005	0	0	1004.83	54	-0.04	0.04	2.1	15.91	0	0.01	0	0
5/1/2020 23:40	13.9	50	25.9	25.9	1005	0	0	1005.79	50	-0.11	0.04	2.09	15.94	0	0.01	0	0
5/2/2020 0:42	12.8	58	20.4	20.4	1005	0	0	1004.36	58	-0.05	0.04	2.1	15.84	0	0.01	0	0
5/2/2020 1:45	13.9	50	33.3	33.3	1004	0	0	1003.88	50	0	0.03	2.08	15.83	0	0	0	0
5/2/2020 2:47	12.8	54	24.1	24.1	1003	0	0	1003.4	54	-0.03	0.03	2.1	15.83	0	0.01	0	0
5/2/2020 3:50	12.8	54	29.6	29.6	1003	0	0	1003.4	54	-0.03	0.03	2.1	15.84	0	0.01	0	0
5/2/2020 4:52	12.8	54	27.8	27.8	1003	0	0	1003.88	54	-0.01	0.03	2.09	15.84	0	0	0	0
5/2/2020 5:55	13.9	50	24.1	24.1	1003	0	0	1003.88	50	-0.13	0.03	2.11	15.87	0	0.01	0	0
5/2/2020 6:57	13.9	50	13	13	1004	0	0	1004.36	50	-0.06	0.03	2.08	15.85	0	0.01	0	0
5/2/2020 8:00	15	44	31.5	31.5	1004	0	0	1004.83	44	-0.05	0.04	2.1	15.82	0	0.01	0	0
5/2/2020 9:02	15	35	46.3	46.3	1005	0	0	1005.31	35	0	0.06	2.17	15.9	0	0	0	0
5/2/2020 10:04	16.1	33	46.3	46.3	1005	0	0	1004.83	33	-0.03	0.04	2.08	16.07	0	0	0	0
5/2/2020 11:06	17.2	31	40.8	40.8	1004	0	0	1004.36	31	0.03	0.03	2	16.24	0	0.01	0	0
5/2/2020 12:09	17.8	27	40.8	61.1	1003	0	0	1003.88	27	0.01	0.04	2.02	16.42	0	0	0	0
5/2/2020 13:11	18.9	29	44.5	44.5	1003	0	0	1003.4	29	0.02	0.05	1.92	16.59	0	0.01	0	0
5/2/2020 14:14	18.9	27	46.3	64.8	1002	0	0	1003.4	27	0	0.04	1.93	16.66	0	0	0	0
5/2/2020 15:17	18.9	29	46.3	64.8	1002	0	0	1003.88	29	0.08	0.03	1.85	16.6	0	0	0	0
5/2/2020 16:19	17.8	29	35.2	53.7	1004	0	0	1004.36	29	0.06	0.02	1.82	16.48	0	0	0	0
5/2/2020 17:22	16.1	36	33.3	33.3	1005	0	0	1005.31	36	-0.06	0.03	1.87	16.38	0	0.01	0	0
5/2/2020 18:25	15	41	25.9	25.9	1006	0	0	1007.69	41	-0.12	0.03	1.89	16.32	0	0.01	0	0
5/2/2020 19:27	13.9	47	31.5	31.5	1008	0	0	1008.64	47	-0.03	0.03	1.9	16.22	0	0.01	0	0
5/2/2020 20:30	13.9	44	31.5	31.5	1008	0	0	1009.12	44	-0.12	0.03	1.98	16.08	0	0	0	0
5/2/2020 21:32	12.8	47	33.3	33.3	1009	0	0	1009.12	47	-0.08	0.04	2.01	16	0	0.01	0	0
5/2/2020 22:35	12.8	43	33.3	33.3	1009	0	0	1009.6	43	-0.06	0.04	2.02	15.98	0	0.01	0	0
5/2/2020 23:37	12.8	47	31.5	31.5	1009	0	0	1009.12	47	0.02	0.04	1.99	15.94	0	0.01	0	0
5/3/2020 0:40	12.8	50	24.1	24.1	1009	0	0	1009.6	50	-0.07	0.04	2.1	15.91	0	0	0	0
5/3/2020 1:42	12.8	54	25.9	25.9	1009	0	0	1010.07	54	0	0.04	2.09	15.88	0	0.01	0	0
5/3/2020 2:45	12.8	54	29.6	29.6	1010	0	0	1010.07	54	-0.06	0.03	1.99	15.93	0	0.01	0	0
5/3/2020 3:47	12.2	57	14.8	14.8	1010	0	0	1011.02	57	-0.01	0.03	1.98	15.89	0	0.01	0	0
5/3/2020 4:50	11.1	61	16.7	16.7	1011	0	0	1012.45	61	0	0.05	1.96	15.92	0	0	0	0
5/3/2020 5:52	12.2	57	25.9	25.9	1013	0	0	1013.4	57	-0.02	0.02	1.98	15.95	0	0	0	0
5/3/2020 6:55	12.2	57	31.5	31.5	1014	0	0	1014.83	57	-0.09	0.04	1.97	15.96	0	0.02	0	0
5/3/2020 7:57	12.2	57	27.8	27.8	1015	0	0	1016.26	57	-0.05	0.03	1.97	15.94	0	0.01	0	0
5/3/2020 8:59	13.9	50	29.6	29.6	1016	0	0	1017.21	50	0.06	0.06	2.05	15.9	0	0.01	0	0
5/3/2020 10:01	15	47	31.5	31.5	1017	0	0	1017.69	47	0.01	0.04	2.06	16.11	0	0.01	0	0
5/3/2020 11:04	17.2	51	25.9	25.9	1017	0	0	1017.69	51	-0.05	0.02	1.91	16.39	0	0.01	0	0
5/3/2020 12:07	17.8	48	33.3	33.3	1018	0	0	1018.17	48	0.01	0.06	1.9	16.58	0	0.01	0	0
5/3/2020 13:09	17.8	48	29.6	29.6	1017	0	0	1018.17	48	0.08	0.08	1.86	16.71	0	0	0	0
5/3/2020 14:12	17.8	48	27.8	27.8	1017	0	0	1018.64	48	-0.09	0.07	1.82	16.76	0	0.02	0	0
5/3/2020 15:14	17.8	55	27.8	27.8	1018	0	0	1019.12	55	-0.03	0.03	1.8	16.69	0	0	0	0
5/3/2020 16:17	17.2	48	22.2	22.2	1018	0	0	1019.12	48	-0.03	0.01	1.88	16.54	0	0	0	0
5/3/2020 17:20	17.2	48	13	13	1019	0	0	1019.6	48	-0.04	0.04	1.88	16.47	0	0.01	0	0

LFG01 Summary (GasFlux Unit)																	
	Temperature (°C)	Relative Humidity (%)	Wind Speed (km/h)	Wind Gust (km/h)	Barometric Pressure (hPa)	Precipitation (mm)	Precip Today (mm)	Well Barometric Pressue (hPa)	Relative Humidity (%)	Steady State Flow Rate (L/hr)	CH4 (% v/v)	C02 (%v/v)	O2 (% v/v)	CO (ppm)	H2S (ppm)	(CH4)	(CO2)
Maximum	27.8	93	53.7	72.2	1025	5.1	24.1	1025.31	93	0.48	0.29	2.37	17.11	0	0.35	0	0.01
Minimum	10	13	0	0	999	0	0	1000.07	13	-0.23	0.01	1.58	15.01	0	0	0	0

1. Exceeds methane 20% v/v
2. GSV calculated based on highest flow rate per location:

Very Low Risk
Low Risk
Moderate Risk
High Risk

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

LFG02 Continious Gas Monitoring Data (GasFlux Unit)																	
	Temperature (°C)	Relative Humidity (%)	Wind Speed (km/h)	Wind Gust (km/h)	Barometric Pressure (hPa)	Precipitation (mm)	Precip Today (mm)	Well Barometric Pressue (hPa)	Relative Humidity (%)	Steady State Flow Rate (L/hr)	CH4 (% v/v)	C02 (%v/v)	O2 (% v/v)	CO (ppm)	H2S (ppm)	(CH4)	(CO2)
Date / Time	Meterological Data							Monitoring Well Data							Continious GSV		
9/4/2020 16:25	20	77	14.8	14.8	1024	0	1	1024.8	20.18	0.04	10.34	8.89	3.11	12.03	0.01	0	0
9/4/2020 17:26	20	82	11.1	11.1	1024	0	2.4	1024.32	19.44	-0.01	11.58	9.44	2.43	10.45	0.06	0	0
9/4/2020 18:28	18.9	82	9.3	9.3	1024	0	2.7	1024.8	18.83	-0.04	12.38	9.98	1.88	9.4	0.01	-0.01	0
9/4/2020 19:29	18.9	82	0	0	1024	0	2.7	1025.28	18.94	-0.08	12.53	10.01	2.01	7.86	0.01	-0.01	-0.01
9/4/2020 20:31	18.9	88	0	0	1025	0	2.7	1025.28	19.3	-0.03	12.66	10.13	2.52	6.93	0.02	0	0
9/4/2020 21:33	18.9	88	3.7	3.7	1025	0	2.4	1024.8	19.99	-0.02	12.45	10.26	2.68	5.63	0.02	0	0
9/4/2020 22:34	17.2	93	0	0	1024	0	1.7	1024.32	21.2	0	13.57	10.64	1.82	5.59	0.01	0	0
9/4/2020 23:36	17.2	93	0	0	1024	0	2.1	1024.32	22.27	0.03	14.95	11.27	1.07	5.43	0.03	0	0
10/4/2020 0:37	17.8	87	5.6	5.6	1023	0.3	2.3	1023.84	23.19	0.06	16.6	11.81	0.43	5.47	0.02	0.01	0.01
10/4/2020 1:39	17.8	87	0	0	1022	0	2.3	1022.87	23.83	0.12	18.64	12.3	0.01	4.66	0.02	0.02	0.01
10/4/2020 2:40	17.8	87	0	0	1022	0.3	2.5	1022.39	24.44	0.14	20.49	12.73	0	4.91	0.02	0.03	0.02
10/4/2020 3:42	17.8	87	9.3	9.3	1021	0.3	1.9	1021.43	25.34	0.18	22.09	12.82	0	4.5	0.01	0.04	0.02
10/4/2020 4:43	17.8	87	7.4	7.4	1021	0.3	1.7	1020.95	26.22	0.15	22.99	12.85	0	3.98	0.02	0.03	0.02
10/4/2020 5:45	17.8	87	7.4	7.4	1020	0.3	3.5	1020.47	26.06	0.14	23.69	12.87	0	3.89	0.01	0.03	0.02
10/4/2020 6:46	17.8	93	7.4	7.4	1020	0.5	3.8	1020.95	26.34	0.06	24.21	12.85	0	3.89	0.06	0.01	0.01
10/4/2020 7:48	18.9	88	9.3	9.3	1020	0.5	3.8	1020.47	27.1	0.05	24.71	12.78	0	3.57	0.05	0.01	0.01
10/4/2020 8:49	18.9	88	14.8	14.8	1020	0.5	4.5	1020.47	27.78	0.11	24.77	12.61	0	3.98	0.04	0.03	0.01
10/4/2020 9:50	18.9	93	14.8	14.8	1019	0.5	0.5	1019.5	28.73	0.15	25.31	12.65	0	3.65	0.06	0.04	0.02
10/4/2020 10:52	20	82	18.5	18.5	1018	0.5	3.8	1018.54	29.19	0.25	25.58	12.65	0	3.61	0.02	0.06	0.03
10/4/2020 11:53	20	82	24.1	24.1	1017	0.5	4	1017.1	29.29	0.35	25.94	12.55	0	2.6	0.02	0.09	0.04
10/4/2020 12:55	20	82	18.5	18.5	1015	0	4.3	1015.17	29.28	0.48	27.08	12.52	0	2.84	0.03	0.13	0.06
10/4/2020 13:56	21.1	77	18.5	18.5	1014	0	4.5	1013.25	31.6	0.45	27.48	12.48	0	2.28	0.01	0.12	0.06
10/4/2020 14:58	22.8	64	22.2	22.2	1012	0	4.2	1012.29	32.37	0.45	27.65	12.22	0	2.56	0.08	0.12	0.06
10/4/2020 15:59	22.8	60	22.2	22.2	1011	0	2.7	1011.32	35.11	0.38	27.99	12.33	0	1.99	0.02	0.11	0.05
10/4/2020 17:00	22.2	68	16.7	16.7	1011	0.3	2.7	1012.29	25.04	0.29	27.95	12.4	0	3	0.01	0.08	0.04
10/4/2020 18:02	16.1	93	14.8	14.8	1012	3	11.7	1012.29	21.06	0.18	28.16	12.09	0	4.26	0.01	0.05	0.02
10/4/2020 19:04	17.2	87	9.3	9.3	1012	0	11.3	1012.29	23.38	0.13	28.37	12.03	0	3.13	0.02	0.04	0.02
10/4/2020 20:05	16.1	87	14.8	14.8	1011	0	13.4	1011.8	25.95	0.18	28.52	11.99	0	2.8	0.02	0.05	0.02
10/4/2020 21:07	16.1	87	13	13	1011	0	13.4	1011.8	27.05	0.15	28.72	11.94	0	2.32	0.03	0.04	0.02
10/4/2020 22:08	16.1	87	20.4	20.4	1011	0	18.2	1010.84	28.21	0.21	28.91	12.13	0	2.07	0.09	0.06	0.03
10/4/2020 23:10	16.1	82	13	13	1010	0	8.6	1010.36	28.95	0.24	28.86	12.07	0	1.87	0.03	0.07	0.03
11/4/2020 0:12	16.1	77	16.7	16.7	1009	0	13.4	1009.4	30.25	0.27	28.88	12.01	0	1.75	0.02	0.08	0.03
11/4/2020 1:13	15	87	25.9	25.9	1009	0	13.4	1008.44	30.96	0.29	29.12	11.95	0	1.55	0.03	0.08	0.03
11/4/2020 2:15	15	87	20.4	20.4	1007	0	12.6	1007.47	31.32	0.41	29.05	12.03	0	1.63	0.02	0.12	0.05
11/4/2020 3:16	15	82	20.4	20.4	1007	0	11.8	1006.99	31.49	0.34	29.38	11.85	0	1.22	0.05	0.1	0.04
11/4/2020 4:18	13.9	87	14.8	14.8	1006	0	11.8	1006.51	30.69	0.26	29.33	11.92	0	1.18	0.06	0.08	0.03
11/4/2020 5:19	15	76	9.3	9.3	1006	0	11.8	1006.51	30.4	0.21	29.73	11.81	0	0.98	0.08	0.06	0.02
11/4/2020 6:21	15.5	75	14.8	14.8	1006	0	11.8	1006.99	30.98	0.1	29.67	11.91	0	1.06	0.05	0.03	0.01
11/4/2020 7:22	16.2	77	28.2	33.7	1010	0	11.8	1006.51	33.72	0.1	29.94	12.03	0	1.22	0.03	0.03	0.01
11/4/2020 8:24	17.7	74	30.7	35	1010.9	0	11.1	1006.03	37.49	0.17	29.7	11.89	0	1.38	0.17	0.05	0.02
11/4/2020 9:25	21.1	52	25.9	25.9	1010.3	0	11.1	1005.07	39.98	0.32	29.83	12.01	0	1.06	0.03	0.1	0.04
11/4/2020 10:26	22.8	40	33.3	33.3	1009.7	0	11.1	1003.14	41.55	0.51	29.86	11.94	0	0.84	0.02	0.15	0.06
11/4/2020 11:28	22.9	45	35.4	49.7	1003	0	10.3	1001.22	42.19	0.51	29.96	11.87	0	0.69	0.09	0.15	0.06
11/4/2020 12:29	26.1	29	37	37	1000	0	9.6	1000.26	43.62	0.58	29.94	11.81	0	0.65	0.04	0.17	0.07
11/4/2020 13:31	26.1	25	40.8	59.3	999	0	9.6	999.77	45.17	0.61	30.08	11.93	0	1.14	0.02	0.18	0.07
11/4/2020 14:32	23.9	31	46.3	72.2	1000	0	9.6	1000.26	44.33	0.36	30.16	11.72	0	1.3	0.02	0.11	0.04
11/4/2020 15:33	2>&																

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

4/14/2020 20:26	20	77	11.1	11.1	1023	0	0	1024.32	42.1	-0.15	0.65	2.17	16.9	0	0.05	0	0
4/14/2020 21:27	18.9	77	0	0	1024	0	0	1024.32	45.72	-0.16	0.17	0.94	19.5	0	0.02	0	0
4/14/2020 22:29	17.8	87	7.4	7.4	1023	0	0	1024.32	48.32	-0.14	0.12	0.93	19.68	0	0.06	0	0
4/14/2020 23:30	17.8	87	9.3	9.3	1023	0	0	1023.84	50.3	-0.09	0.11	1.15	19.4	0	0.02	0	0
4/15/2020 0:32	17.2	93	3.7	3.7	1023	0	0	1023.84	51.64	-0.05	0.17	1.51	18.62	0	0.03	0	0
4/15/2020 1:33	17.2	87	5.6	5.6	1023	0	0	1023.35	52.36	-0.05	0.27	2.07	17.49	0	0.05	0	0
4/15/2020 2:35	17.2	87	9.3	9.3	1023	0	0	1022.87	53.33	0	0.53	3.11	14.73	0	0.02	0	0
4/15/2020 3:37	16.1	87	9.3	9.3	1023	0	0	1022.87	53.9	-0.01	1.2	4.8	10.74	0	0.02	0	0
4/15/2020 4:38	16.1	87	11.1	11.1	1022	0	0	1022.87	54.99	-0.08	2.11	6.24	7.35	0.21	0.02	0	-0.01
4/15/2020 5:40	16.1	87	11.1	11.1	1022	0	0	1022.87	54.79	-0.05	2.49	6.73	6.34	0.13	0.03	0	0
4/15/2020 6:41	16.1	87	11.1	11.1	1023	0	0	1022.87	55.55	-0.13	2.8	7.09	6.05	0.15	0.03	0	-0.01
4/15/2020 7:42	17.8	77	11.1	11.1	1023	0	0	1023.84	58.83	-0.14	2.08	5.89	9.67	0	0.02	0	-0.01
4/15/2020 8:44	18.9	72	14.8	14.8	1023	0	0	1023.84	61.92	-0.07	1.54	4.54	12.3	0	0.02	0	0
4/15/2020 9:45	22.2	60	13	13	1023	0	0	1022.87	65.57	0	2.1	5.69	9.95	0	0.04	0	0
4/15/2020 10:47	23.9	53	13	13	1022	0	0	1021.91	65.15	0.09	4.62	9.08	3.53	2.31	0.08	0	0.01
4/15/2020 11:48	27.2	44	11.1	11.1	1021	0	0	1020.95	64.98	0.16	7.77	10.88	0.84	3.81	0.02	0.01	0.02
4/15/2020 12:50	27.8	41	14.8	14.8	1020	0	0	1019.99	62.89	0.15	10.75	11.88	0	5.39	0.05	0.02	0.02
4/15/2020 13:51	26.1	44	24.1	24.1	1019	0	0	1019.02	63	0.17	13.33	12.38	0	6.16	0.02	0.02	0.02
4/15/2020 14:52	26.1	47	22.2	22.2	1018	0	0	1018.54	58.03	0.13	14.87	12.86	0	5.88	0.02	0.02	0.02
4/15/2020 15:54	25	50	24.1	24.1	1017	0	0	1018.06	63.48	0.14	15.99	12.95	0	6.4	0.14	0.02	0.02
4/15/2020 16:55	23.9	56	25.9	25.9	1017	0	0	1018.06	60.2	0.09	16.83	13.09	0	7.17	0.02	0.02	0.01
4/15/2020 17:57	22.8	60	20.4	20.4	1017	0	0	1018.06	43.66	0.05	17.17	13.23	0	8.1	0.01	0.01	0.01
4/15/2020 18:58	22.8	64	18.5	18.5	1017	0	0	1018.06	40.25	0	17.37	13.13	0	7.46	0.01	0	0
4/15/2020 20:00	22.8	64	16.7	16.7	1017	0	0	1018.06	42.06	0.03	17.77	13.26	0	7.54	0.01	0.01	0
4/15/2020 21:02	22.8	64	11.1	11.1	1017	0	0	1017.58	44.86	0.04	18.27	12.98	0	6.85	0.06	0.01	0.01
4/15/2020 22:03	21.1	72	1.9	1.9	1017	0	0	1017.1	47.17	0.05	18.34	12.97	0	5.27	0.01	0.01	0.01
4/15/2020 23:05	20	77	5.6	5.6	1016	0	0	1016.14	48.98	0.15	19.07	13.02	0	5.23	0.1	0.03	0.02
4/16/2020 0:06	20	72	1.9	1.9	1015	0	0	1015.65	51.17	0.15	19.94	13.03	0	4.5	0.06	0.03	0.02
4/16/2020 1:08	18.9	72	0	0	1015	0	0	1014.69	51.97	0.15	20.46	13.22	0	3.89	0.04	0.03	0.02
4/16/2020 2:09	18.9	77	0	0	1014	0	0	1014.21	54.03	0.16	21.17	13.21	0	3.49	0.06	0.03	0.02
4/16/2020 3:11	17.8	82	11.1	11.1	1013	0	0	1013.73	54.76	0.18	21.81	13.09	0	3.12	0.05	0.04	0.02
4/16/2020 4:12	17.8	82	9.3	9.3	1013	0	0	1014.21	55.96	0.05	22.03	13.02	0	2.88	0.02	0.01	0.01
4/16/2020 5:14	17.8	77	11.1	11.1	1014	0	0	1014.21	58.34	-0.02	22.13	13.18	0	2.88	0.02	0	0
4/16/2020 6:15	18.9	72	7.4	7.4	1014	0	0	1014.69	59.67	-0.05	22.07	13.01	0	3.57	0.04	-0.01	-0.01
4/16/2020 7:17	18.9	72	9.3	9.3	1014	0	0	1014.21	61.04	0.03	21.99	12.89	0	3.33	0.06	0.01	0
4/16/2020 8:18	21.1	68	13	13	1014	0	0	1013.73	62.84	0.06	22.39	13	0	2.88	0.06	0.01	0.01
4/16/2020 9:20	22.8	56	9.3	9.3	1014	0	0	1013.73	64.67	0.08	22.32	12.91	0	2.84	0.09	0.02	0.01
4/16/2020 10:21	23.9	49	16.7	16.7	1013	0	0	1013.25	66.77	0.11	22.9	13.07	0	3.04	0.09	0.03	0.01
4/16/2020 11:22	26.1	47	20.4	20.4	1012	0	0	1011.8	67.72	0.23	23.34	12.83	0	2.28	0.03	0.05	0.03
4/16/2020 12:24	27.2	41	25.9	25.9	1011	0	0	1010.84	67.02	0.26	23.41	12.92	0	2.48	0.03	0.06	0.03
4/16/2020 13:25	27.2	38	25.9	25.9	1010	0	0	1009.4	66.49	0.24	23.86	12.85	0	2.4	0.08	0.06	0.03
4/16/2020 14:27	27.2	38	20.4	20.4	1009	0	0	1009.4	62.34	0.16	24.2	12.82	0	2.84	0.16	0.04	0.02
4/16/2020 15:28	26.1	44	16.7	16.7	1009	0.5	0.5	1008.92	59.25	0.12	24.34	12.73	0	2.8	0.05	0.03	0.02
4/16/2020 16:30	27.2	41	16.7	16.7	1008	0	0	1008.44	57.69	0.14	24.69	12.6	0	2.96	0.06	0.03	0.02
4/16/2020 17:31	26.1	41	25.9	25.9	1008	0	0	1008.92	59.16	0.05	24.93	12.72	0	2.76	0.08	0.01	0.01
4/16/2020 18:33	26.1	41	18.5	18.5	1009	0	0	1009.4	58.81	-0.01	24.65	12.64	0	2.72	0.03	0	0
4/16/2020 19:34	25	43	18.5	18.5	1009	0	0	1009.4	55.13	-0.01	24.09	12.69	0.01	1.91	0.02	0	0
4/16/2020 20:36	25	43	16.7	16.7	1009	0	0	1009.88	53.5	0.02	24.44	12.62	0	3.81	0.06	0	0
4/16/2020 21:37	25	41	27.8	27.8	1009	0	0	1009.4	55.59	0.03	24.72	12.58	0	3.33	0.02	0.01	0
4/16/2020 22:39	25	43	22.2	22.2	1009	0	0	1009.4	57.35	0.06	25.07	12.8	0	2.92	0.02	0.02	0.01
4/16/2020 23:40	23.9	46	16.7	16.7	1008	0	0	1008.92	58.28	0.05	25.05	12.63	0	2.15	0.02	0.01	0.01
4/17/2020 0:42	22.8	49	9.3	9.3	1008	0	0	1008.44	59.29	0.04	25.64	12.67	0	2.48	0.06	0.01	0.01
4/17/2020 1:43	18.9	77	16.7	16.7	1009	0	0	1009.4	62.41	0.03	23.59	12.48	0.98	0.45	0.03	0.01	0
4/17/2020 2:45	18.9	93	25.9	25.9	1009	0	0	1009.4	63.42	0.05	24.29	12.49	0.41	1.26	0.06	0.01	0.01
4/17/2020 3:46	18.9	88	24.1	24.1	1009	0	0	1010.36	63.13	-0.05	23.52	12.49	0.82	1.39	0.03	-0.01	-0.01
4/17/2020 4:48	18.9	88	13	13	1009	0	0	1009.88	61.73	-0.06	20.89	11.63	2.66	0	0.15	-0.01	-0.01
4/17/2020 5:49	17.8	87	9.3	9.3	1010	0	0	1009.88	59.2	-0.05	21.2	11.61	2.37	0	0.11	-0.01	-0.01
4/17/2020 6:51	18.9	67	11.1	11.1	1010	0	0	1010.84	63	-0.03	16.81	10.06	5.87	0	0.04	-0.01	0
4/17/2020 7:52	20	45	29.6	29.6	1011	0	0	1011.8	67.54	-0.07	10.79	6.99	10.92	0	0.09	-0.01	0
4/17/2020 8:54	21.1	40	31.5	31.5	1011	0	0	1010.84	70.66	0.25	10.29	7.07	10.87	0	0.12	0.03	0.02
4/17/2020 9:55	22.2	37	25.9	25.9	1011	0	0	1010.84	72.3	0.03	10.59	7.5	10.13	0	0.03	0	0
4/17/2020 10:57	22.8	30	27.8	27.8	1011	0	0	1010.84	71.79	0.13	11.01	8.05	9.24	0	0.02	0.01	0.01
4/17/2020 11:58	25	25	24.1	24.1	1010	0	0	1009.88	72.31	0.28	12.77	9.1	6.92	0	0.07	0.04	0.03
4/17/2020 12:59	26.1	23	24.1	24.1	1009	0	0	1008.92	72.63	0.18	15.95	10.57	3.77	0	0.03	0.03	0.02
4/17/2020 14:01	27.2	16	22.2	22.2	1008	0	0	1008.92	74.49	0.14	19.15	11.75	1.75	0.98	0.03	0.03	0.02
4/17/2020 15:02	27.2	14	24.1	24.1	1008	0	0	1008.92	71.79	0.09	21	12.17	0.81	2.48	0.08	0.02	0.01
4/17/2020 16:04	26.1	16	27.8	27.8	1009	0	0	1008.92	75.92	0.07	21.72	12.36	0.43	3.33	0.12	0.02	0.01
4/17/2020 17:05	25	17	18.5	18.5	1009	0	0	1009.88	63.23	0.04	21.28	12.55	0.52	4.5	0.02	0.01	0.01
4/17/2020 18:07	23.9	17	25.9	25.9	1009	0	0	1010.36	48.15	-0.07	18.4	11.74	3.05	0.02	0	-0.01	-0.01
4/17/2020 19:08	22.2	19	20.4	20.4	1010	0	0	1010.36	46.86	-0.06	15.15	10.01	5.95	0	0.02	-0.01	-0.01
4/17/2020 20:10	21.1	19	18.5	18.5	1011	0	0	1010.84	47.77	-0.13	10.17	7.25	10.58	0	0.01	-0.01	-0.01
4/17/2020 21:11	18.9	25	9.3	9.3	1011	0	0	1011.8	49.46	-0.19	6.32	4.92	14.19	0	0.04	-0.01	-0.01
4/17/2020 22:13	17.8	29	11.1	11.1	1012	0	0	1012.29	51.42	-0.18	3.73	3.35	16.64	0	0.02	-0.01	-0.01
4/17/2020 23:15	17.2	33															

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

4/24/2020 15:28	27.2	31	16.7	16.7	1015	0	0	1016.14	59.03	-0.05	15.14	12.34	3.2	0.71	0.01	-0.01	-0.01
4/24/2020 16:29	25	43	16.7	16.7	1016	0	0	1016.14	61.93	-0.08	13.74	11.71	4.68	0.11	0.09	-0.01	-0.01
4/24/2020 17:31	22.8	56	11.1	11.1	1016	0	0	1017.1	47.88	-0.14	9.37	8.73	9.73	0	0.01	-0.01	-0.01
4/24/2020 18:32	21.1	68	11.1	11.1	1017	0	0	1018.54	41.23	-0.17	4.16	4.46	15.77	0	0.01	-0.01	-0.01
4/24/2020 19:34	20	72	3.7	3.7	1018	0	0	1019.02	42.37	-0.17	0.88	1.28	19.72	0	0.02	0	0
4/24/2020 20:36	20	72	5.6	5.6	1019	0	0	1019.5	46.85	-0.16	0.17	0.61	20.38	0	0.01	0	0
4/24/2020 21:37	18.9	82	1.9	1.9	1019	0	0	1019.99	50.14	-0.15	0.06	0.49	20.42	0	0.02	0	0
4/24/2020 22:39	18.9	77	1.9	1.9	1020	0	0	1019.99	54.31	-0.13	0.05	0.5	20.34	0	0.02	0	0
4/24/2020 23:40	17.8	82	0	0	1020	0	0	1019.99	56.08	-0.12	0.05	0.5	20.3	0	0.03	0	0
4/25/2020 0:42	17.2	82	0	0	1020	0	0	1019.99	58.48	-0.08	0.04	0.6	20.17	0	0.03	0	0
4/25/2020 1:43	17.2	82	11.1	11.1	1020	0	0	1019.99	59.21	-0.1	0.06	0.72	20.02	0	0.08	0	0
4/25/2020 2:45	16.1	82	9.3	9.3	1020	0	0	1019.99	60.17	-0.08	0.06	0.85	19.89	0	0.06	0	0
4/25/2020 3:46	16.1	77	9.3	9.3	1020	0	0	1019.99	62.42	-0.08	0.07	1.08	19.69	0	0.03	0	0
4/25/2020 4:48	15	82	13	13	1020	0	0	1019.99	63.25	-0.11	0.07	1.17	19.62	0	0.03	0	0
4/25/2020 5:49	16.1	77	11.1	11.1	1020	0	0	1020.47	65.8	-0.12	0.04	1.09	19.76	0	0.06	0	0
4/25/2020 6:51	16.1	77	13	13	1021	0	0	1021.43	67.35	-0.14	0.06	0.73	19.95	0	0.03	0	0
4/25/2020 7:52	16.1	77	16.7	16.7	1022	0	0	1022.39	72.02	-0.16	0.07	0.38	20.12	0	0.06	0	0
4/25/2020 8:54	18.9	63	13	13	1022	0	0	1021.91	76.77	-0.12	0.08	0.38	20.18	0	0.02	0	0
4/25/2020 9:55	22.2	52	11.1	11.1	1021	0	0	1021.43	81.1	-0.06	0.08	0.5	20.13	0	0.06	0	0
4/25/2020 10:57	23.9	46	11.1	11.1	1021	0	0	1021.43	82.72	0	0.07	0.72	20.05	0	0.03	0	0
4/25/2020 11:58	25	43	13	13	1020	0	0	1019.99	84.66	0.02	0.11	1.41	19.26	0	0.04	0	0
4/25/2020 12:59	27.2	41	16.7	16.7	1019	0	0	1018.54	82.12	0.07	1.21	4.91	11.92	0.11	0.06	0	0
4/25/2020 14:01	26.1	50	25.9	25.9	1017	0	0	1017.58	78.92	0.06	6.88	10.37	3.35	1.18	0.02	0	0.01
4/25/2020 15:02	25	53	24.1	24.1	1017	0	0	1017.58	73.96	0.02	10	11.54	1.7	2.6	0.06	0	0
4/25/2020 16:04	25	53	27.8	27.8	1017	0	0	1017.1	78.42	0.03	12.35	12.41	0.97	2.68	0.02	0	0
4/25/2020 17:05	23.9	60	27.8	27.8	1016	0	0	1017.1	67.8	0	13.79	12.89	0.49	3.77	0.04	0	0
4/25/2020 18:07	22.8	64	29.6	29.6	1016	0	0	1017.1	52.07	-0.03	14.55	13.22	0.28	5.67	0	0	0
4/25/2020 19:08	22.8	64	27.8	27.8	1017	0	0	1017.1	50.85	-0.04	14.39	12.92	0.87	4.58	0.01	-0.01	-0.01
4/25/2020 20:10	22.2	64	27.8	27.8	1017	0	0	1017.58	52.88	-0.07	14.18	12.62	1.27	5.03	0.02	-0.01	-0.01
4/25/2020 21:11	21.1	68	13	13	1018	0	0	1017.58	54.63	-0.08	12.5	11.5	3.6	2.15	0.02	-0.01	-0.01
4/25/2020 22:13	21.1	64	11.1	11.1	1017	0	0	1017.1	56.08	-0.03	13.28	11.85	2.69	2.88	0.02	0	0
4/25/2020 23:15	18.9	67	13	13	1017	0	0	1017.1	57.76	-0.02	14.41	12.41	1.62	4.1	0.06	0	0
4/26/2020 0:16	18.9	67	13	13	1016	0	0	1016.62	59.06	-0.02	15.54	12.91	0.85	3.89	0.05	0	0
4/26/2020 1:18	17.8	72	11.1	11.1	1016	0	0	1016.14	60.83	-0.01	16.31	13.1	0.44	4.74	0.09	0	0
4/26/2020 2:19	17.2	72	11.1	11.1	1016	0	0	1015.65	62.92	0.05	17.86	13.34	0.08	5.03	0.08	0.01	0.01
4/26/2020 3:21	16.1	77	13	13	1014	0	0	1014.69	63.15	0.04	19.94	13.57	0	4.42	0.04	0.01	0.01
4/26/2020 4:22	16.1	72	9.3	9.3	1014	0	0	1013.73	63.89	0.05	21.26	13.48	0	3.29	0.02	0.01	0.01
4/26/2020 5:24	15	76	11.1	11.1	1014	0	0	1013.25	63.95	0.05	22.5	13.54	0	3.57	0.12	0.01	0.01
4/26/2020 6:25	15	82	11.1	11.1	1013	0	0	1014.21	64.23	-0.03	22.98	13.48	0	3.57	0.03	-0.01	0
4/26/2020 7:27	15	82	7.4	7.4	1014	0	0	1014.69	69.88	-0.07	21.74	13.08	1.12	3.24	0.09	-0.02	-0.01
4/26/2020 8:28	17.8	63	11.1	11.1	1015	0	0	1015.17	77.06	-0.1	19.21	12.29	3.15	1.18	0.08	-0.02	-0.01
4/26/2020 9:30	20	52	16.7	16.7	1015	0	0	1014.69	82.01	-0.02	19.32	12.11	2.82	1.44	0.03	0	0
4/26/2020 10:31	25	35	20.4	20.4	1014	0	0	1013.73	86.34	0.04	20.59	12.61	1.72	1.99	0.12	0.01	0.01
4/26/2020 11:32	27.2	34	20.4	20.4	1013	0	0	1012.77	88.54	0.14	22.56	13.25	0.52	4.02	0.08	0.03	0.02
4/26/2020 12:34	27.2	31	24.1	24.1	1012	0	0	1012.29	89.2	0.21	23.87	13.42	0	4.74	0.06	0.05	0.03
4/26/2020 13:35	27.2	29	37	37	1012	0	0	1011.32	82.12	0.1	24.54	13.56	0	5.47	0.02	0.02	0.01
4/26/2020 14:37	27.2	29	24.1	24.1	1011	0	0	1011.8	74.19	0.05	24.84	13.75	0	4.34	0.05	0.01	0.01
4/26/2020 15:38	26.1	31	24.1	24.1	1012	0	0	1012.77	70.4	-0.06	24.1	13.52	0.64	4.06	0.08	-0.01	-0.01
4/26/2020 16:40	25	35	25.9	25.9	1013	0.5	0.5	1013.25	68.75	-0.12	16.35	10.25	6.69	0	0.02	-0.02	-0.01
4/26/2020 17:41	23.9	43	20.4	20.4	1014	0	0	1014.69	69.08	-0.18	10.32	6.93	11.65	0	0.03	-0.02	-0.01
4/26/2020 18:43	22.2	56	33.3	33.3	1015	0	0	1016.14	70.08	-0.11	4.05	3.18	17.06	0	0.08	0	0
4/26/2020 19:44	21.1	56	25.9	25.9	1017	0	0	1016.62	69.86	-0.15	0.73	0.85	19.93	0	0.06	0	0
4/26/2020 20:46	20	55	24.1	24.1	1017	0	0	1017.58	68.97	-0.2	0.15	0.38	20.41	0	0.02	0	0
4/26/2020 21:47	18.9	55	16.7	16.7	1018	0	0	1019.02	66.71	-0.25	0.08	0.27	20.45	0	0.02	0	0
4/26/2020 22:49	17.8	59	11.1	11.1	1019	0	0	1019.5	71.5	-0.17	0.07	0.28	20.42	0	0.09	0	0
4/26/2020 23:50	18.9	59	22.2	22.2	1019	0	0	1019.99	74.4	-0.16	0.09	0.28	20.39	0	0.02	0	0
4/27/2020 0:52	17.8	63	18.5	18.5	1020	0	0	1020.47	75.47	-0.17	0.07	0.28	20.36	0	0.02	0	0
4/27/2020 1:53	17.8	67	13	13	1020	0.3	0.3	1020.47	77.4	-0.12	0.08	0.28	20.34	0	0.03	0	0
4/27/2020 2:55	17.8	87	25.9	25.9	1020	0.3	0.3	1020.47	78.98	-0.12	0.09	0.28	20.26	0	0.05	0	0
4/27/2020 3:56	18.9	82	16.7	16.7	1020	0.3	0.3	1020.95	79.5	-0.12	0.09	0.28	20.23	0	0.12	0	0
4/27/2020 4:58	17.2	87	16.7	16.7	1021	0.3	0.3	1021.43	79.45	-0.11	0.1	0.4	20.21	0	0.03	0	0
4/27/2020 5:59	17.2	87	16.7	16.7	1021	0.3	0.7	1021.91	77.49	-0.14	0.09	0.27	20.25	0	0.08	0	0
4/27/2020 7:01	17.2	87	13	13	1022	0	0.5	1022.39	76.97	-0.15	0.09	0.28	20.24	0	0.04	0	0
4/27/2020 8:02	17.8	82	13	13	1023	0	0.5	1023.35	79.88	-0.17	0.09	0.16	20.27	0	0.06	0	0
4/27/2020 9:04	18.9	77	13	13	1024	0	1	1023.84	85.54	-0.15	0.11	0.16	20.28	0	0.03	0	0
4/27/2020 10:05	18.9	82	13	13	1023	0	0	1023.84	89.46	-0.1	0.1	0.29	20.25	0	0.11	0	0
4/27/2020 11:06	20	72	13	13	1023	0	0.5	1023.84	90.95	-0.09	0.12	0.28	20.24	0	0.09	0	0
4/27/2020 12:08	20	72	13	13	1023	0	1	1023.35	89.6	-0.06	0.12	0.5	20.19	0	0.03	0	0
4/27/2020 13:09	20	77	16.7	16.7	1022	0	1.9	1022.39	85.17	-0.04	0.06	0.61	20.12	0	0.05	0	0
4/27/2020 14:11	20	77	14.8	14.8	1022	0.3	1.9	1022.39	82.34	-0.06	0.08	0.83	19.83	0	0.11	0	0
4/27/2020 15:12	20	82	13	13	1023	0	2.2	1022.87	78.63	-0.07	0.08	0.94	19.74	0	0.02	0	0
4/27/2020 16:14	21.1	64	11.1	11.1	1023	0	1	1022.87	75.2	-0.08	0.08	0.94	19.75	0	0.03	0	0
4/27/2020 17:15	21.1	64	11.1	11.1	1023	0	1	1022.87	73.23	-0.1	0.07	0.94	19.66	0	0.02	0	0
4/27/2020 18:17	20	72	0	0	1023	0	1.9	1023.84	72.53	-0.14	0.05	0.72	19.96	0	0.01	0	0
4/27/2020 19:18	21.1	68	16.7	16.7													

Table D1: Ground Gas Continuous Monitoring
Job Name: Caringbah Toyota
Job Number: 58037

4/30/2020 2:38	18.9	82	9.3	9.3	1007	0	1.3	1006.99	79.61	0.13	26.78	13.4	0	2.8	0.05	0.03	0.02
4/30/2020 3:40	18.9	88	9.3	9.3	1007	0	1.3	1006.51	81.22	0.1	27.64	13.34	0	4.02	0.05	0.03	0.01
4/30/2020 4:41	18.9	82	9.3	9.3	1006	0	1.3	1006.03	81.01	0.08	27.83	13.37	0	4.5	0.13	0.02	0.01
4/30/2020 5:42	18.9	82	11.1	11.1	1006	0	2.3	1006.51	82.21	0.01	28.1	13.28	0	3.41	0.08	0	0
4/30/2020 6:44	17.8	87	9.3	9.3	1006	0	2.3	1006.51	82.75	0.03	27.76	13.15	0	3.77	0.03	0.01	0
4/30/2020 7:45	18.9	82	5.6	5.6	1006	0.3	2.8	1006.51	84.85	0.01	28.29	13.18	0	3.61	0.09	0	0
4/30/2020 8:47	20	82	1.9	1.9	1006	0	2.5	1006.51	86.94	0.01	28.36	13.15	0	3.09	0.16	0	0
4/30/2020 9:48	18.9	88	3.7	3.7	1006	3	3.4	1006.51	86.79	0.04	28.34	13.35	0	2.32	0.06	0.01	0.01
4/30/2020 10:50	18.9	88	3.7	3.7	1006	3	5.3	1005.55	82.8	0.1	28.57	13.27	0	3.33	0.11	0.03	0.01
4/30/2020 11:51	15	93	24.1	24.1	1005	0.3	7.9	1005.55	76.2	0.12	26.5	12.87	1.09	2.31	0.06	0.03	0.02
4/30/2020 12:53	13.9	93	14.8	14.8	1005	0.5	10	1004.1	76.81	0.12	27.62	13.18	0.11	3.61	0.02	0.03	0.02
4/30/2020 13:54	13.9	93	9.3	9.3	1005	3	8.8	1005.55	78.72	0.02	26.03	12.74	1.15	2.44	0.06	0.01	0
4/30/2020 14:56	13.9	93	16.7	16.7	1006	3	8.8	1006.51	79.95	-0.05	21.86	11.37	3.83	0.34	0.08	-0.01	-0.01
4/30/2020 15:57	13.9	93	7.4	7.4	1006	3	24.1	1006.99	81.41	-0.07	20.72	11.01	4.65	0.02	0.09	-0.01	-0.01
4/30/2020 16:59	13.9	82	27.8	27.8	1007	0.5	5.3	1007.47	78.96	-0.05	19.12	10.55	5.32	0.02	0.09	-0.01	-0.01
4/30/2020 18:00	12.8	87	18.5	18.5	1007	0.3	9.7	1007.95	78.11	0.02	15.74	9.29	7.58	0	0.06	0	0
4/30/2020 19:02	12.8	87	22.2	22.2	1008	0.3	8.2	1008.44	80.48	-0.05	11.95	7.76	10.22	0	0.03	-0.01	0
4/30/2020 20:03	12.8	76	22.2	22.2	1008	0	7.9	1008.92	81.82	-0.11	10.05	6.72	11.71	0	0.14	-0.01	-0.01
4/30/2020 21:05	12.2	81	20.4	20.4	1008	0	7.9	1008.44	81.89	-0.08	9.99	7	11.28	0	0.12	-0.01	-0.01
4/30/2020 22:06	12.2	76	20.4	20.4	1008	0	8.6	1008.44	80.82	-0.06	10.63	7.64	10.2	0	0.14	-0.01	0
4/30/2020 23:08	12.2	71	16.7	16.7	1008	0	6.9	1007.95	80.83	-0.04	11.59	8.46	8.91	0	0.09	0	0
1/5/2020 0:09	12.2	66	20.4	20.4	1008	0	6.9	1007.95	79.24	-0.05	12.84	9.31	7.2	0.02	0.06	-0.01	0
1/5/2020 1:11	12.2	62	16.7	16.7	1007	0	6.9	1007.95	78.52	-0.05	14.2	10.12	5.75	0.06	0.08	-0.01	-0.01
1/5/2020 2:12	11.1	66	16.7	16.7	1007	0	6.9	1007.47	77.92	0.01	15.63	10.78	4.32	0.58	0.03	0	0
1/5/2020 3:14	11.1	61	14.8	14.8	1007	0	6.9	1006.99	78.1	-0.05	16.91	11.23	3.39	0.98	0.03	-0.01	-0.01
1/5/2020 4:15	11.1	61	22.2	22.2	1007	0	6.9	1007.95	79.28	-0.06	17.38	11.4	2.98	1.08	0.06	-0.01	-0.01
1/5/2020 5:17	11.1	61	16.7	16.7	1008	0	6.9	1007.95	81.88	-0.05	17.35	11.78	2.9	1.26	0.06	-0.01	-0.01
1/5/2020 6:18	11.1	61	16.7	16.7	1007	0	6.9	1008.44	82.94	-0.08	17.86	11.86	2.43	1.51	0.09	-0.01	-0.01
1/5/2020 7:20	12.2	57	20.4	20.4	1008	0	6.9	1008.92	82.41	-0.09	15.19	10.93	4.87	0.15	0.06	-0.01	-0.01
1/5/2020 8:21	13.9	50	20.4	20.4	1009	0	6.9	1008.92	88.91	0.01	14.16	10.45	5.8	0.18	0.14	0	0
1/5/2020 9:22	15	41	29.6	48.2	1009	0	22.1	1007.95	92.61	0.05	14.38	10.56	5.36	0.1	0.08	0.01	0.01
1/5/2020 10:24	15	35	37	55.6	1008	0	4.4	1007.95	92.21	0.39	15.83	11.18	3.73	0.71	0.06	0.06	0.04
1/5/2020 11:25	16.1	36	42.6	61.1	1007	0	4.4	1006.99	91.01	0.29	17.27	12.09	2.53	0.74	0.06	0.05	0.04
1/5/2020 12:27	17.2	33	48.2	48.2	1007	0	3.6	1006.51	90.07	0.26	19.5	12.52	1.48	1.55	0.06	0.05	0.03
LFG02 Summary (GasFlux Unit)																	
	Temperature (°C)	Relative Humidity (%)	Wind Speed (km/h)	Wind Gust (km/h)	Barometric Pressure (hPa)	Precipitation (mm)	Precip Today (mm)	Well Barometric Pressue (hPa)	Relative Humidity (%)	Steady State Flow Rate (L/hr)	CH4 (% v/v)	C02 (%v/v)	O2 (% v/v)	CO (ppm)	H2S (ppm)	(CH4)	(CO2)
Maximum	27.8	93	53.7	72.2	1025	3	24.1	1025.28	92.61	0.61	30.16	14.07	20.51	12.03	0.17	0.18	0.07
Minimum	11.1	14	0	0	999	0	0	999.77	18.83	-0.27	0.03	0.14	0	0	0	-0.03	-0.01

1. Exceeds methane 20%
2. GSV calculated based on highest flow rate per location:

Very Low Risk
Low Risk
Moderate Risk
High Risk

Table D2: Ground Gas Results Spot Monitoring
Job Number: 58037
Job Name: Caringbah




Date	Location	Well Depth (mBGL)	Screen interval (mBGL)	Standing water level (mBTC)	Well Condition	Gas Flow Rate (L/hr)	Methane (%v/v)	Carbon Dioxide (%v/v)	Carbon Monoxide (ppm)	Hydrogen Sulfide (ppm)	Oxygen (%v/v)	Max Flow for Round	GSV Methane	GSV CO2	Max GSV	Characteristic Gas Situation
Ground Gas Monitoring Wells																
22/01/2020	MW1	4.5	1.5	2.473	OK	0.5	0.0	9.1	0.0	0.0	11.2	0.5	0.00	0.05	0.05	1 - Very Low Risk
22/01/2020	MW2	4.0	1.0	1.625	OK	0.1	0.0	2.5	0.0	0.0	17.0	0.5	0.00	0.00	0	1 - Very Low Risk
22/01/2020	MW3	4.5	1.5	2.236	OK	0.4	0.2	21.0	1.0	0.0	1.3	0.5	0.00	0.08	0.08	2 - Low Risk
22/01/2020	MW4	5.5	2.5	4.029	OK	0.4	13.0	10.4	2.0	0.0	4.4	0.5	0.05	0.04	0.05	1 - Very Low Risk
22/01/2020	MW5	4.5	1.5	1.825	OK	-0.3	0.0	4.3	2.0	0.0	14.6	0.5	0.00	-0.01	0	1 - Very Low Risk
22/01/2020	MW6	3.0	1.5	2.081	OK	-0.2	0.0	5.1	0.0	0.0	14.6	0.5	0.00	-0.01	0	1 - Very Low Risk
22/01/2020	MW7	3.5	1.0	1.373	OK	0.2	4.8	9.0	5.0	0.0	1.5	0.5	0.01	0.02	0.02	1 - Very Low Risk
29/01/2020	MW1	4.5	1.5	2.401	OK	0.1	0.0	13.0	0.0	0.0	8.5	0.3	0.00	0.01	0.01	1 - Very Low Risk
29/01/2020	MW2	4.0	1.0	1.655	OK	0.1	0.1	3.4	0.0	0.0	17.2	0.3	0.00	0.00	0	1 - Very Low Risk
29/01/2020	MW3	4.5	1.5	2.263	OK	0.3	0.3	25.2	1.0	0.0	0.3	0.3	0.00	0.08	0.08	2 - Low Risk
29/01/2020	MW4	5.5	2.5	4.132	OK	0.2	38.6	6.5	3.0	0.0	0.1	0.3	0.08	0.01	0.08	2 - Low Risk
29/01/2020	MW5	4.5	1.5	1.802	OK	-0.2	0.0	18.3	2.0	0.0	1.5	0.3	0.00	-0.04	0	1 - Very Low Risk
29/01/2020	MW6	3.0	1.5	2.142	OK	0.0	0.0	6.9	2.0	0.0	1.5	0.3	0.00	0.00	0	1 - Very Low Risk
29/01/2020	MW7	3.5	1.0	1.399	OK	0.1	0.0	1.9	2.0	0.0	17.2	0.3	0.00	0.00	0	1 - Very Low Risk
Sub Slab Points																
21/01/2019	VP01	-	-	-	-	0.1	0.0	4.8	2.0	0.0	4.2	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP02	-	-	-	-	0.1	0.0	4.2	7.0	0.0	9.0	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP03	-	-	-	-	0.1	0.0	2.8	1.0	0.0	13.2	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP04	-	-	-	-	0.1	0.0	5.5	2.0	1.0	6.5	0.5	0.00	0.01	0.01	1 - Very Low Risk
21/01/2019	VP05	-	-	-	-	0.1	0.0	0.6	3.0	0.0	12.7	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP06	-	-	-	-	0.1	0.0	5.1	2.0	0.0	8.2	0.5	0.00	0.01	0.01	1 - Very Low Risk
21/01/2019	VP07	-	-	-	-	0.1	0.0	1.2	27.0	0.0	7.9	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP08	-	-	-	-	0.1	0.0	0.0	5.0	0.0	20.5	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP09	-	-	-	-	0.1	0.0	0.0	3.0	0.0	20.7	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP10	-	-	-	-	0.1	0.0	0.0	4.0	0.0	20.8	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP11	-	-	-	-	0.1	0.0	6.3	3.0	0.0	10.5	0.5	0.00	0.01	0.01	1 - Very Low Risk
21/01/2019	VP12	-	-	-	-	0.1	0.0	14.3	4.0	0.0	1.4	0.5	0.00	0.01	0.01	1 - Very Low Risk
21/01/2019	VP13	-	-	-	-	0.1	0.0	10.7	7.0	0.0	0.2	0.5	0.00	0.01	0.01	1 - Very Low Risk
21/01/2019	VP14	-	-	-	-	0.1	0.0	0.0	5.0	0.0	16.8	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP15	-	-	-	-	0.1	0.0	2.7	1.0	0.0	17.3	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP16	-	-	-	-	0.1	0.0	0.0	1.0	0.0	18.7	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP17	-	-	-	-	0.1	0.0	0.6	0.0	0.0	9.7	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP18	-	-	-	-	0.2	0.0	0.7	8.0	0.0	18.3	0.5	0.00	0.00	0.00	1 - Very Low Risk
21/01/2019	VP19	-	-	-	-	0.5	0.0	1.5	20.0	0.0	16.5	0.5	0.00	0.01	0.01	1 - Very Low Risk
21/01/2019	VP20	-	-	-	-	0.4	36.9	0.0	2.0	1.0	0.2	0.5	0.15	0.00	0.15	2 - Low Risk
21/01/2019	VP21	-	-	-	-	0.2	32.9	0.3	2.0	0.0	0.2	0.5	0.07	0.00	0.07	2 - Low Risk

- 1. Grey Shaded = screen fully submerged
- 2. GSV calculated based on highest flow rate per location
- 3. **Methane** above 20% v/v
- 4. **Carbon Dioxide** above 5% v/v

Appendix C Field Logs




PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,878.26
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 06-Apr-20	NORTHING 6,232,194.99
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	1/2	0.2		Fill	FILL - Gravelly SAND - Dark brown, heterogeneous, dry, loose, coarse sand: angular gravel including asphalt	D	BH24A_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - brown / yellow, heterogeneous, damp, medium grained, including concrete, loose gravel	SM	BH24A_0.2-1		
		1.2		Fill	FILL - SAND - grey, homogeneous, wet, medium grained, loose	W	BH24A_1-2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		2.2		SC	Dark grey, homogeneous, high plasticity, wet, medium grained, medium dense	W			
		3.2							Organic Odour, No Staining or ACM
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							






PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,865.56
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 06-Apr-20	NORTHING 6,232,203.67
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.2		Fill	FILL - Roadbase - gravelly sand, dark brown, heterogeneous, dry, loose, coarse sand including asphalt	D	BH24B_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - clayey sand, brown, heterogeneous, damp, loose, coarse sand, including large gravels, iron stained gravels	SM	BH24B_0.2-1		
		1.0		Fill	FILL - SAND - grey, wet, homogeneous, medium grained, loose	W	BH24B_1-2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		2.0					BH24B_2-2.5		
		2.6		SC	Dark grey, homogeneous, high plasticity, wet, medium grained, medium dense	W			Organic Odour, No Staining or ACM
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							







PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,869.26
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 06-Apr-20	NORTHING 6,232,188.43
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.2		Fill	FILL - Roadbase - gravelly sand, dark brown, dry, loose, coarse sand, subangular gravels	D	BH24C_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - clayey sand, brown, heterogeneous, damp, medium dense, coarse sand with gravel and clay chunks, glass, slag	SM	BH24C_0.2-1		
		0.6		Fill	FILL - SAND - clayey sand, grey, homogeneous, wet, medium grained, loose, clay chunks (grey, High Plasticity, firm)	W	BH24C_1-2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.8							
		1.0					BH24C_2-2.5		
		1.2		SC	Dark grey, homogeneous, wet, medium grained, loose	W			Organic Odour, No Staining or ACM
		1.4							
		1.6							
		1.8							
		2.0							
		2.2							
		2.4							
		2.6							
		2.8							
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							






PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,885.56
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 06-Apr-20	NORTHING 6,232,179.12
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.2		Asphalt	FILL - Roadbase - gravelly sand, dark brown, dry, loose, coarse sand, subangular gravels	D	BH24D_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - gravelly SAND, brown, heterogeneous, coarse sand, loose, dry, subangular gravels, including charcoal, slag, shells, plastic	D	BH24D_0.2-0.8		
		0.6		Fill	FILL - SAND - grey homogenous wet, coarse sand, medium density	W	BH24D_0.8-1.8		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.8							
		1.0					BH24D_1.8-2.5		
		1.2		SC	Brown / grey, homogenous, wet, coarse grained, medium density	W			No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.4							
		1.6							
		1.8							
		2.0							
		2.2							
		2.4							
		2.6							
		2.8							
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							



PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,872.01
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 06-Apr-20	NORTHING 6,232,215.63
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.2		Asphalt	FILL - Roadbase - gravelly sand, dark brown, dry, loose, coarse sand, subangular gravels	D	BH24E_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - red / brown, damp, heterogeneous, including clay chunks, gravel	SM	BH24E_0.2-1.1		
		1.2		Fill	FILL - SAND - grey, wet, homogenous, coarse sand, medium density	W	BH24E_1.1-2.1		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		2.2					BH24E_2.1-2.5		
		2.6		SC	Brown / grey, homogenous, wet, coarse grained, medium density	W			Organic Odour, No Staining or ACM
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							












PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,886.3
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 07-Apr-20	NORTHING 6,232,205.15
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	1/4	0.2		Fill	FILL - Roadbase - Gravelly SAND, dark brown, dry, heterogeneous, coarse grained, sub angular gravels, loose	D	BH24F_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - red / brown, heterogeneous, damp, coarse, loose, including find gravels, shells	SM	BH24F_0.2-0.5		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.6		Fill	FILL - SAND - brown, heterogeneous, damp, coarse, loose, including find gravels, shells	SM	BH24F_0.5-1.5		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.6		Fill	FILL - SAND - grey, saturated, coarse, homogenous, medium density	W	BH24F_1.5-2.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		2.2		SC	brown / grey, homogenous, saturated, coarse, medium density	W			No Odour or Staining
		2.4							
		2.6							
		2.8							
		3							
		3.2							
		3.4							
		3.6							
		3.8							
		4							
		4.2							
		4.4							
		4.6							




PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,895.93
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 07-Apr-20	NORTHING 6,232,198.49
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA		0.2		Fill	FILL - Roadbase - gravelly sand, dry, heterogenous, coarse, loose	D	BH24G_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - red / brown, heterogeneous, damp, coarse, loose, including gravels, slag, tiles	SM	BH24G_0.2-0.4		
		0.6							
		0.8		Fill	FILL - SAND - grey, wet, medium density, medium grained	W	BH24G_1-2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.0							
		1.2							
		1.4							
		1.6							
		1.8							
		2.0							
		2.2							
		2.4							
		2.6							
		2.8							
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							




PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,905.24
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 07-Apr-20	NORTHING 6,232,191.93
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations	
SFA		0.2		Fill	FILL - Roadbase - gravelly sand, dark brown, dry, coarse sand, loose, heterogeneous, including tree roots	D	BH24H_0-0.3		No Odour or Staining. 10L AQ: No ACM (0% w/w)	
		0.4		Fill	FILL - SAND - red / brown, damp, heterogeneous, coarse, loose including gravels	SM	BH24H_0.3-0.6		No Odour or Staining. 10L AQ: No ACM (0% w/w)	
		0.6		Fill	FILL - Clayey SAND - dark brown, damp, coarse, medium density, heterogenous, clay chunks (grey / red, high plasticity, firm), including gravels, charcoal	SM	BH24H_0.6-1.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)	
		0.8							No Odour or Staining. 10L AQ: No ACM (0% w/w).	
		1		Fill	FILL - sandy GRAVEL - dense, trace demo waste, slag, tile, mainly rounded gravels	D	BH24H_1.2-1.3		Refusal on Concrete	
		1.2								
		1.4								
		1.6								
		1.8								
		2								
		2.2								
		2.4								
		2.6								
		2.8								
		3								
		3.2								
		3.4								
		3.6								
		3.8								
		4								
4.2										
4.4										
4.6										







PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,899.53
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 07-Apr-20	NORTHING 6,232,208.65
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	1/2	0.2		Fill	FILL - Roadbase - gravelly sand, dry, heterogenous, coarse, loose	D	BH24I_0-0.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - gravelly SAND - red / brown, coarse sand, loose, large, sub angular gravels, including slag	D	BH24I_0.2-1.2		
		0.6		Fill	FILL - SAND - grey, wet, coarse, medium density, trace glass	W	BH24I_1.2-2.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.8							
		1.0					BH24I_2.2-2.5		
		1.2		SC	Peat band, black, saturated, medium grained, medium density	W	BH24I_2.5-3		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.4							
		1.6							
		1.8							
		2.0							
		2.2							
		2.4							
		2.6							
		2.8							
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							



PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,885.24
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 07-Apr-20	NORTHING 6,232,218.6
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	1/4	0.2		Fill	FILL - Roadbase - gravelly sand, dark brown, dry, heterogeneous, coarse, loose, subangular gravels	D	BH24J_0-0.4		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - red / brown, damp, heterogeneous, coarse, loose	SM	QAQC20200407_A		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.6		Fill	FILL - Clayey SAND - brown: heterogeneous, damp, medium grained, medium density, clay clumps (red / grey, high plasticity, firm), including gravels	SM	BH24J_0.6-1.5		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.8							
		1.0							
		1.2							
		1.4							
		1.6		Fill	FILL - SAND - grey, homogenous, wet, coarse, medium density	W	BH24J_1.5-2.5		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.8							
		2.0							
		2.2							
		2.4							
		2.6		SC	Peat band, black, saturated, medium grained, medium density	W	BH24J_2.5-2.8		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		2.8							
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							





PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,899.53
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 07-Apr-20	NORTHING 6,232,208.65
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

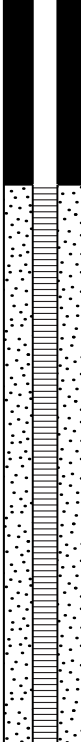
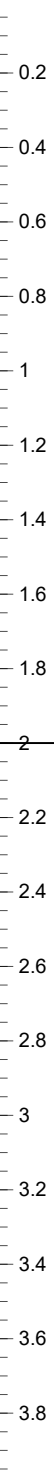


COMMENTS

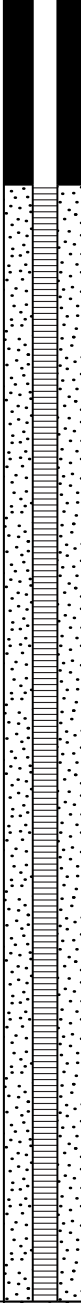


Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	1/2	0.2		Fill	FILL - Roadbase - gravelly sand, dark brown, dry, heterogeneous, coarse, loose, subangular gravels	D	BH24K_0-0.3		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - red / brown, heterogeneous, damp, coarse, loose, including fine gravels	SM	QAQC20200407_B		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.6		Fill	FILL - clayey SAND - dark brown, damp, heterogeneous, coarse, medium density, clay clumps (grey, high plasticity, firm)	SM	BH24K_0.5-1.2		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.2		Fill	FILL - SAND - grey, saturated coarse, homogeneous, medium density	W	BH24K_1.2-2.5		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		2.6		SC	Peat band, black, saturated, medium grained, medium density	W			No Odour or Staining. 10L AQ: No ACM (0% w/w)
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							

PROJECT NUMBER 58037	DRILLING COMPANY Terratest	EASTING 327,905.24
PROJECT NAME Caringbah Due Dilligence	DRILLING DATE 07-Apr-20	NORTHING 6,232,191.93
CLIENT Aliro Management Pty Ltd	DRILL RIG	COORD SYS N/A
ADDRESS 13 Endeavour Road, Caringbah, NSW	DRILLING METHOD Solid Flight Auger	COORD SOURCE
	DIAMETER 200 mm	LOGGED BY MN

COMMENTS

Drilling Method	Water (m bgl)	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations
SFA	V	0.2		Fill	FILL - Roadbase - gravelly sand, dark brown, dry, heterogeneous, coarse, loose, subangular gravels	D	BH24L_0-0.3		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.4		Fill	FILL - SAND - red / brown, heterogeneous, damp, coarse, loose, including fine gravels	SM	BH24L_0.3-1		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		0.6							
		0.8							
		1.0		Fill	FILL - SAND - light brown, heterogeneous, damp, coarse, loose, including fine gravels	SM	BH24L_1-1.4		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.2							
		1.4		Fill	FILL - SAND - grey, homogeneous, wet, coarse, medium density	W	BH24L_1.4-2.5		No Odour or Staining. 10L AQ: No ACM (0% w/w)
		1.6							
		1.8							
		2.0							
		2.2							
		2.4							
		2.6		SC	Peat band, black, saturated, medium grained, medium density	W			No Odour or Staining. 10L AQ: No ACM (0% w/w)
		2.8							
		3.0							
		3.2							
		3.4							
		3.6							
		3.8							
		4.0							
		4.2							
		4.4							
		4.6							

PROJECT NUMBER 58037				DRILLING COMPANY Terratest				EASTING 327,907.89			
PROJECT NAME Caringbah Due Dilligence				DRILLING DATE 06-Apr-20				NORTHING 6,232,175.94			
CLIENT Aliro Management Pty Ltd				DRILL RIG				ELEVATION N/A			
PERMIT NO. N/A				DRILLING METHOD Solid Flight Auger				COORD SYS N/A			
ADDRESS 13 Endeavour Road, Caringbah, NSW				TOTAL DEPTH 2 m bgl				COORD SOURCE			
				DIAMETER 150 mm				LOGGED BY MN			
COMPLETION 06/04/2020				CASING PVC				SCREEN INTERVAL 0.5 - 2 m bgl			
COMMENTS											
Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations	
SFA					Asphalt	FILL - Asphalt	D				
					Fill	FILL - Roadbase - Gravelly SAND, Dark Brown, Heterogeneous, Damp, Medium Grained, Loose including gravels	D				
					Fill	FILL - SAND - yellow medium grained, homogeneous, damp, loose, wet at 2.2m bgs	W				
			2			Termination Depth at:2.00 m.					
			2.2								
			2.4								
			2.6								
			2.8								
			3								
			3.2								
			3.4								
			3.6								
			3.8								

PROJECT NUMBER 58037				DRILLING COMPANY Terratest				EASTING 327,894.34			
PROJECT NAME Caringbah Due Dilligence				DRILLING DATE 06-Apr-20				NORTHING 6,232,184.73			
CLIENT Aliro Management Pty Ltd				DRILL RIG				ELEVATION N/A			
PERMIT NO. N/A				DRILLING METHOD Solid Flight Auger				COORD SYS N/A			
ADDRESS 13 Endeavour Road, Caringbah, NSW				TOTAL DEPTH 3.5 m bgl				COORD SOURCE			
				DIAMETER 150 mm				LOGGED BY MN			
COMPLETION 06/04/2020				CASING PVC				SCREEN INTERVAL 0.5 - 3.5 m bgl			
COMMENTS											
Drilling Method	Water (m bgl)	Well Details	Depth (m bgl)	Graphic Log	Lithological Class	Lithological Description	Moisture	Samples	PID	Additional Observations	
SFA			0.2		Fill	FILL - SAND - topsoil sandy, S.H, dark brown, heterogeneous, damp, soft, including gravels and rootlets	D				
			0.4		Fill	FILL - SAND - clayey sand, dark brown / grey, heterogeneous, damp, L.P, soft including terracotta, charcoal gravels, brick fragments	D				
			0.6		2.8	SC	Disturbed estuarine sediment: Heterogeneous,damp, M.P, soft high organic content, wet at 4m bgs				
3											
3.2											
3.4											
3.6											
3.8											
							Termination Depth at:3.50 m.				





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