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Report on
Preliminary Site Investigation (Contamination)

Due Diligence Assessment - September 2021
Lots 19-23 DP746311
Bungaree Street, Maitland

Prepared for
Eagers Automotive Limited

Project 18412.01
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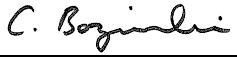
Reviewer		7 March 2024

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Executive Summary

This report presents the results of a preliminary site investigation (PSI) and preliminary contamination testing undertaken at Lots 19-23 DP746311, Bungaree Street, Maitland, New South Wales (NSW).

At the time of investigation (April 2021 to September 2021), the site was occupied by a car sales yard and motor vehicle servicing and detailing centre, operated by the Brian Kelly Trotter Motor Group (KTMG). The southern portion of the site comprises an open surface water body which is part of the Telarah lagoon which is undeveloped. It is understood that redevelopment is not proposed; the current use will continue (i.e. the PSI was required for due diligence purposes).

The objective of the PSI was to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regard to continued use for commercial/industrial purposes.

The PSI comprised a review of available published information, previous investigations by DP , brief site history review, site walkover, discussions with site personnel, preparation of a conceptual site model, drilling boreholes, installation of groundwater wells and laboratory analysis of selected soil, sediment and groundwater samples for potential contaminants of concern.

The site history information suggested the absence of significant site activities or development prior to the current development which was largely established from the late 1990s. Prior to this, the site was vacant grassland based on title deeds records from 1920s and aerial photos from 1954. The northern corner of the site may have been used as part of cattle stockyards. From the late 1990s the site was developed into a commercial car dealership and servicing centre which continues to operate. A number of additions to buildings have occurred from 2000s to 2016 based on aerials and Council development application (DA) records.

A number of potential contaminating activities were identified on site including the presence of fill to raise site levels, active underground fuel storage tank (UST), oil storage and in ground waste oil-tank, wash bay, activities related to automotive goods storage and use, and possible impacts from off-site/adjacent industrial development.

It is noted that the preliminary subsurface investigation focused on the identified contamination risk areas within the developed area of the site currently in use.

The results of limited soil, groundwater and sediment testing were generally within adopted human health and ecological site assessment criteria for commercial and industrial land use based on a generic/conservative assessment. Extensive fill materials were present across the site. One elevated result in fill was above the commercial/industrial health screening levels at Bore 108/1.0 m. The source of elevated contamination has not identified and therefore may be indicative of fill in the northern part of the site.

Investigation near the UST (three bores) and the waste oil tank (one bore only) were necessarily limited by the underground infrastructure and safe set back distances.

Impact to soil was not identified downgradient of the waste oil tank / former wash bay at Bore 104, however, observations indicated hydrocarbon/oil staining at the surface of the building perimeter. Residual impacts to soils are likely to be present, however, such impacts may be localised rather than widespread. The possible presence or the extent of such impacts has not been determined.

Hydrocarbon impact to soil was not identified within bores downgradient of the active UST. Based on our experience, however, residual impacts may be present in the vicinity of underground fuel tanks and associated infrastructure (i.e. tank backfill, fuel /service lines). This may include residual impacts to soil and possible impacts to perched groundwater, if present.

Based on the results of the PSI, the following is recommended:

- Review / audit of the current UST loss monitoring procedures, leak detection of UPSS system, record keeping and environmental management of the area with reference to regulatory and statutory requirements. This should include installation of a third groundwater monitoring well and biannual groundwater monitoring to align with NSW EPA *Underground Petroleum Storage Systems Regulation* (NSW EPA, 2020b);
- Removal of the UST and associated infrastructure, if proposed, should be undertaken with Removal of the UST and associated infrastructure, if proposed, should be undertaken with reference to NSW EPA (2014c) *Technical Note: Investigation of Service Station Sites*;
- Improvement of existing environmental controls including clean up of localised hydrocarbon spills within the waste oil store to minimise the potential for migration / overflows and surface water run-off.

It is noted that a number of sources/areas of potential contamination were identified and limited testing has been conducted across the developed area of the site. Variable fill materials, sediments and residual impacts may be present within the site. Further assessment would be required to assess the possible presence, extent and implications (if any) of the identified potential sources of contamination.

Based on the results of the preliminary site investigation and the results of limited contamination testing of soils, groundwater and sediment, the current facility is considered to be suitable for continued commercial/industrial use with respect to contamination.

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1. Introduction

Douglas Partners Pty Ltd (DP) was engaged by Eagers Automotive Limited to undertake this preliminary site investigation (PSI) and preliminary contamination testing at Lots 19-23 DP746311, Bungaree Street, Maitland, New South Wales (NSW). This PSI included preliminary soil and groundwater testing. The investigation was undertaken with reference to DP's proposal 207251.P.001.Rev0 dated 23 July 2021.

The 'site' is defined as Lots 19-23 DP746311 as shown in Drawing 1 in Appendix E. At the time of investigation, the site was occupied by a car sales yard and motor vehicle servicing and detailing centre, operated by the Brian Kelly Trotter Motor Group (KTMG). The southern portion of the site comprises an open surface water body which is part of the Telarah lagoon which is undeveloped. It is understood that redevelopment is not proposed; the current use will continue (i.e. PSI was required for due diligence purposes).

The objective of the PSI was to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regard to the current development / land use.

The assessment was conducted from April 2021 to September 2021 and must be read in conjunction with all appendices including the notes provided in Appendix A.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020a);
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).

2. Scope of Work

The scope of work for the PSI comprised the following:

- Review of available published information on the site including geological, topographical, acid sulfate soil and soil landscape maps and search of registered groundwater bores in the area;
- Review of a previous geotechnical investigation by DP at the site - DP (1995);
- Brief site history review to assess the potential for contamination comprising a review of aerial photographs, Safe Work NSW search, NSW EPA register searches, title deeds search, review of Section 10.7 planning certificate and council record searches and third party business records search;

- Walkover by a senior engineer from DP to identify areas of potential contamination and assess current site condition;
- Discussions with site personnel familiar with current and previous site activities;
- Preparation of a Conceptual Site Model (CSM) for the site, which refines the potential contaminant sources, potential receptors and exposure pathways;
- Drilling of nine boreholes (Bores 101 to 109) using a truck mounted push tube rig to facilitate soil sampling;
- Screening of soil samples, surface water. groundwater and groundwater well headspace for volatile organic compounds (VOC) using a photoionisation detector (PID);
- Installation of groundwater monitoring wells in two of the boreholes (Bores 105 and 106) followed by development and sampling of groundwater from the wells;
- Sediment sampling at one location (S1);
- Field screening of surface water at three locations (SW1 to SW3);
- Laboratory analysis of selected soil, sediment and two groundwater samples;
- Preparation of this report.

3. Site Information

Site Address	Bungaree Street, Maitland
Legal Description	Lot 19-23 D.P. 746311
Area	1.72 ha
Local Council Area	Maitland City Council (MCC)
Zoning	Approximately follows lot boundaries: MCC Zone B6 Enterprise Corridor – Northern portion (Lot 19-21). This zoning promoted businesses along main road and is permitted for a range of business types. MCC Zone E2 Environmental Conservation - Southern portion (Lot 22-23).
Current Use	Car Dealership and servicing centre (Commercial)
Surrounding Uses	North – Bungaree Street / New England Highway, then commercial / retail. North-west - Bungaree Street, then Bunnings Warehouse, other commercial premises. East – New England Highway, then residential and commercial (hotel). South – Telarah Lagoon. South-east - Bungaree Street, then residential. West – Bungaree Street, vacant low-lying upgradient areas of Telarah Lagoon.

Figure 1: Lot 19-23 DP746311 shown in red (Image source: Six Maps, aerial 2015)

4. Environmental Setting

Regional Topography	With reference to NSW 2 m contours topography of the region generally ranges from approximately RL 0 AHD in surface water bodies to approximately RL 20 AHD on hilltops.
Site Topography	With reference to NSW 2 m contours, the site elevation ranges from approximately RL 4 AHD in the southern portion of the site to RL 14 AHD in the northern portion of the site.
Soil Landscape	The NSW Soil Landscape mapping indicates the site is underlain by two main soil domains. • Northern portion - soils typical of the 'Bolwarra Heights' map, which typically comprise moderately deep (<150 cm), well-drained Yellow Podzolic Soils ,Red Podzolic Soils and Brown Podzolic Soils with some moderately deep <100 cm), well-drained Lithosols on crests, moderately deep (<140 cm), imperfectly drained yellow Soloths on lower slopes. • Southern portion - soils typical of the 'Hunter Valley Variant A' map, which typically comprise deep (>150 cm), moderately well to imperfectly drained Prairie Soils, deep (>150 cm), imperfectly to poorly drained Brown Clays, some deep (>150 cm), well-drained Chernozems. Deep (>200 cm), well to imperfectly drained Alluvial Soils on levees, ox-bows, and recent overbank deposits. Moderately deep (>80 cm), well-drained Siliceous Sands on point bar and river bank deposits.
Geology	With reference to the NSW seamless geology mapping indicates the site is underlain by two main geological formations. • Northern portion - underlain by the Branxton Formation which comprises roadian aged conglomerate, sandstone and siltstone. • Southern portion - underlain by alluvial valley deposits which typically comprise silt, clay, sand and gravel.
Acid Sulfate Soils	With reference to NSW Acid Sulfate Soil risk map, the southern half of the site is partially mapped as "high probability of occurrence" at "greater than 3 m below the ground surface". This approximately correlates to areas of the site < 8 AHD. The northern half of the site is mapped as no known occurrence of ASS.
Surface Water	Surface water west of Bungaree Street (upslope) flows onto the site via a culvert under Bungaree Street. The upgradient surface water receives stormwater from upslope properties including the Bunnings development and residential development, which then discharges onto the low-lying surface water body present within the southern parts of the investigation site. The site surface water body is connected to and drains via a culvert beneath Ledsam footbridge to the Telarah Lagoon to the south. Surface water runoff from the developed areas within the site pass via a water holding tank and gross pollutant trap, which discharges to a small on site sediment dam on the northern side of the water body (sampling locations S1 / SW1). The sediment dam discharges to the main surface water body to the south. The site surface water body therefore receives surface water inflows from both the main site activities and upgradient sources.

Groundwater	A search of Water NSW Groundwater bore database indicates one registered groundwater bore within 500 m of the site. Bore GW0669950 is located about 200 m south-east of the site and installed to a depth of 14 m for domestic and stock purposes. The water bearing zone is recorded as 8 m to 10 m depth. The bore is considered to be upgradient of the Telarah Lagoon but not directly upgradient of the site. The Water NSW Work Summary in included in Appendix B.

5. Site History

5.1 Previous Investigations (DP, 1995)

DP has previously undertaken a geotechnical investigation in the northern portion of the current site in October 1995 (DP, 1995). The investigation was undertaken prior to construction of the current development. The geotechnical investigation comprised excavation of 10 test pits across the northern (now developed) areas of the site, to inform the planned construction of the saleyard. A copy of the test location plan is shown in Appendix E, with test pit logs include in Appendix A.

The pertinent results of the investigation relevant to this assessment were as follows:

- The site was generally vacant at the time of investigation and was densely vegetated (grassed);
- The site was described as “slightly undulating with the ground surface sloping downwards to the south-west at approximately 5° to 7°” towards a low-lying lagoon at the southern end of the site;
- Some soils were stockpiled in the central portion of the site to a height of about 1.5 m. Photographs indicated the presence of anthropogenic inclusions such as concrete, brick, timber and tree roots. Smaller stockpiled were also located in the south-east part of the land based site area. Some excavations / surface material stripping were apparent in the northern part of the site which suggested natural soils were present at the surface in this area;
- The subsurface investigation (Pits TP1 to TP10) generally comprised the following:
    - Fill generally comprising clayey sandy silt / silty sand with trace anthropogenic inclusions (clay pipe) (only in TP1, TP2 and TP7) of about 1 m thick or superficial topsoil; underlain by
    - Clay / silty clay / sandy clay encountered at 0.95 m to 3.4 m below ground (limit of investigation); underlain by
    - Siltstone/sandstone encountered at 0.95 m to 3.0 m below ground level.
- Groundwater was not observed in any of the pits during the investigation. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

It is noted that investigation report was limited to geotechnical assessment and did not include contamination testing for site soils or stockpiled materials. The source or condition of the imported soils is therefore not known.

Photographs from the 1995 investigation are shown in Figure 1 to Figure 4.

Figure 1: Central and southern portion of the site and existing surface water body (1995)

Figure 2: Stripped surface soils in the northern / north-eastern part of the site (1995)

Figure 3: Stockpiles soils (approx central and southern portion of the site) (1995)

Figure 4: Stockpiled soils in central / northern part of site including anthropogenic materials (1995)

5.2 Title Deeds

A historical title deeds search was used to obtain ownership and occupancy information including company names and the occupations of individuals that have historically possessed the title. The title information can assist in the identification of previous land uses by the company names/site owners and can therefore, assist in establishing whether there were potentially contaminating activities occurring at the site.

A historic title deeds search was undertaken for the Lot 19-23 DP746311 by InfoTrack Pty Ltd which is included in Appendix D. A summary of findings is presented in Table 1.

.

Table 1: Historical Title Deeds

Date of Acquisition and Term Held	Registered Proprietor(s) & Occupations	Inferred Land Use
Lot 19		
01.06.1928 (1928 to 1930)	Joseph Bede Enright John Patrick Sarsfield Enright (Auctioneer)	Cattle salesyard?
14.05.1930 (1930 to 1994)	Council of the Municipality of West Maitland Now Council of the City of Maitland	Unknown (vacant land?)
10.10.1994 (1994 to 1994)	Albada Pty Ltd	Commercial (Car Dealership)
02.12.1994 (1994 to date)	Davpov Pty Limited	Commercial (Car Dealership)
Lot 20 – 22		
01.06.1928 (1928 to 1960)	Joseph Bede Enright John Patrick Sarsfield Enright (Auctioneer) (& their deceased estates)	Cattle salesyard?
15.06.1960 (1960 to 1994)	John Stewart Buffier (Cattle Dealer)	Cattle salesyard?
10.10.1994 (1994 to 1996)	Albada Pty Ltd	Commercial (Car Dealership)
05.08.1996 (1996 to date)	Davpov Pty Limited	Commercial (Car Dealership)
Lot 23		
11.05.1923	Within Crown Reserve No. 56146 from Sale or Lease	Unknown (vacant land?)
1931 (1931 to 1954)	Joseph Bede Enright John Patrick Sarsfield Enright (Auctioneer)	Cattle salesyard?
08.03.1954 (1954 to 1960)	John Patrick Sarsfield Enright (Auctioneer) Also John Patrick Sarsfield Enright (Auctioneer) (Life Estate re Joseph Bede Enright) John Patrick Sarsfield Enright (Auctioneer) John Anthony O'Brien (Company Director) (Estate in remainder re Joseph Bede Enright)	Cattle salesyard?
13.04.1960 (1960 to 1960)	John Anthony O'Brien (Gentleman) (Estate in remainder re Joseph Bede Enright) Mary Enright (Widow) Walter Anthony Gerard Enright (Solicitor) Julian Joseph Enright (Stockman) (Section 94 Application not investigated)	Cattle salesyard?
15.06.1960 (1960 to 1994)	John Stewart Buffier (Cattle Dealer)	Cattle salesyard?
10.10.1994 (1994 to 1994)	Albada Pty Ltd	Commercial (Car Dealership)
02.12.1994 (1994 to date)	Davpov Pty Limited	Commercial (Car Dealership)

5.3 Historical Aerial Photography

Several historical aerial photographs were obtained from public databases. A summary of key features observed for the site, broader lot and surrounding land is presented in Table 2.

Table 2: Summary of Historical Aerial Photographs

Year Quality Figure	Site	Surrounding Land Use
1954 B&W Figure 5	The site appears to be mostly grassed / cleared land. The southern portion of the site (Lot 23) is a part of Telarah Lagoon. The northern corner of the site may be part of the development to the north-east (possible cattle sales yard).	No development immediately adjacent sites with exception of residential developments to the east and a development to the north-east (possible cattle sales yard). Majority of developments in the vicinity of the site appear to be residential. Ledsam Street is present along the southern boundary of the site, probably unsealed. A railway is present approximately 250 m west of the site.
1977 Colour Figure 6	Similar to 1954 aerial (grassed, undeveloped). Telarah Lagoon contains water (brown in colour). Several trees in northern part of site. Possible fencing (east-west) in northern part of site.	Similar to 1954 aerial.
1984 B&W Figure 7	Similar to 1977 aerial.	Similar to 1977 aerial.
1986 B&W	Similar to 1984 aerial. Contours present on the aerial which indicate the site ranges from approximately RL 4 m AHD (southern boundary / Telarah Lagoon) to RL 14 m AHD (northern boundary)	Similar to 1984 aerial.
1993 Colour Figure 8	Tree rows are present along the northern and eastern boundary of the site.	Significant infrastructure development is present to the immediate north, east and west of the site comprising construction of New England Highway, Bungaree Street, and a large roundabout to the immediate north of the site (previously possible cattle yard).
2001 Colour Figure 9	Significant development at the site. Developments comprise a building in the centre of lot 22 (current main warehouse / workshop), a building in along the boundary between Lot 21/22 (current showroom / office) and construction of pavements and carparks throughout Lots 19 – 22.	Similar to 1993 aerial.
2007 Colour Figure 10	Similar to 2001 aerial.	Large structure present to the north-west of the site with surrounding pavements.
2010 Colour Figure 11	Further development at the site. Developments comprise construction of a building and surrounding pavements/carparks in the southern portion of lot 22, extensions to the west and southern edges of the building in lot 21/22.	Similar to 2007 aerial.
23 April 2021 Colour	Similar to 2010 aerial.	Similar to 2010 aerial.

Figure 5: 1954 aerial

Figure 6: 1977 aerial

Figure 7: 1984 aerial

Figure 8: 1993 aerial

Figure 9: 2001 aerial

Figure 10: 2007 aerial

Figure 11: 2010 aerial

5.4 Public Registers and Planning Records

EPA Notices available under Section 58 of the Contaminated Lands Management Act (CLM Act) (1)	There were no records of notices for the site or adjacent sites.
Sites notified to EPA under Section 60 of the CLM Act (1)	The site or adjacent site was not listed as a notified contaminated site.
Licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act)(1)	There were no records issued to the site or adjacent sites.
SafeWork NSW (2)	No relevant records identified for the site. The on-site UST currently in use does not appear to be registered.
Council Records Date – ID - Description	For Lot 22: 02/03/2015 - Development Application DA15/0356 for Removal of three (3) Trees. 04/04/2016 – Development Application DA16/0716 for Commercial Additions and Alterations 30/09/2016 – Construction Certificate CCP16/2283 for Commercial Alterations & Additions
Council Section 10.7 Certificate	The site was not reported as significantly contaminated land, undergoing contamination audit or subject to an ongoing maintenance order.
NSW Department of Primary Industries Cattle Dip Site Locator (3)	There were no registered cattle dip sites within the MCC local government area.
NSW EPA PFAS Investigation Sites (3)	The closest listed NSW EPA per- and polyfluoroalkyl substances (PFAS) investigation site was 4.6 km north-west.

Notes:

(1) Database search dated 29 July 2021

(2) Database search dated 31 August 2021

(3) Database search dated 31 August 2021

5.5 Business Records Search

A third party search of historical business data was used to obtain information both past and present of potentially contaminating activities at the site and at nearby sites. The report is included in Appendix D.

A summary of relevant findings is presented in Table 3.

Table 3: Summary of Contamination Setting Report

Site Name	Type	Distance & Direction	Status
Heritage Motor Group	Used Cars	On site	2000s to present
Beaurepaires for Tyres Rutherford	Tyre Shop	65 m north	Currently operating
Raceart Designs	Signwriters	120 m north	Currently operating
The Maitland Hospital	Hospital	170 m north east	Currently operating
Rutherford Muffer & Suspension Centre	Exhaust Shop	80 m north west	1990s
Flaks W & Sons	Whitegoods Service and Repairs	170 m north west	1990s
Kirkwood Produce Stores	Fertiliser Supplies	170 m north west	1990s
Performing Art Signs	Motor Repairs	165 m north	2000s

5.6 Site History Integrity Assessment

The information used to establish the history of the site was sourced from reputable and reliable reference documents, many of which were official records held by Government departments/agencies. The databases maintained by various Government agencies potentially can contain high quality information, but some of these do not contain any data at all.

In particular, aerial photographs provide high quality information that is generally independent of memory or documentation. They are only available at intervals of several years, so some gaps exist in the information from this source. The observed site features are open to different interpretations and can be affected by the time of day and/or year at which they were taken, as well as specific events, such as flooding. Care has been taken to consider different possible interpretations of aerial photographs and to consider them in conjunction with other lines of evidence.

5.7 Summary of Site History

The site history information suggests the following:

- The site was generally free of significant development based on title deeds records from 1920s and aerial photos from 1954. The northern corner of the site may have been used as part of cattle stockyards;
- The showroom and warehouse and surrounding pavements were constructed in the late 1990s (based on aerials);
- The car detailing workshop and surrounding pavements were constructed in the late 2000s (based on aerials);

- A number of additions and alterations to buildings have occurred in 2016 (based on council DA records).

6. Site Walkover

6.1 Observations (April 2021)

A site walkover was undertaken by a senior environmental engineer on 2 August 2021. The general site topography was consistent with that described in Section 4. The site layout appears to have remained unchanged from the 24 April 2021 aerial photograph. The following key site features pertinent to the PSI were observed:

- The northern and elevated portion of the site was used as a vehicle sales yard. The topography was tiered with retaining walls, suggesting some cut / fill or importation of fill. Vehicles were parked on asphalt or concrete pavements (Figure 12 and Figure 13);
- A showroom, offices and amenities building was located in the northern portion of the site, south of sales yard (Figure 12). The floors were typically tile over the suspended concrete slab. The south-western portion of the building was two storey, comprising administration offices;
- A servicing, and repairs warehouse was located in the central portion of the site (Figure 13). The main part of the building (servicing) was elevated above the western side (new parts storage, office and retail area). The main workshop building was an open warehouse with concrete floors with minor falls to direct and surface water runoff to internal drains. The drains are directed to the GPT upgradient of the surface water sediment dam. Vehicle hoists were present. No in-ground inspection pits were observed;
- The concrete floored oil store on the south-eastern corner of the workshop building and included an in-ground concrete oil collection sump (open pit with surface grate) (Figure 16 and Figure 17). Motor oils were stored in 160 L drums and wall / above ground mounted metal containers. Smaller quantities of oils, hydrocarbon, coolants were also stored e.g. 20 L plastic container. An intermediate bulk container (IBC) was within the store for collection of waste oils for collection and off-site disposal (Figure 17). Hydrocarbon staining of the adjacent concrete outside the collection sump was mostly minor, with some thick built up on the northern side of the store at the location of an oil rag collection recycling bin. The concrete surface was generally in good condition (i.e. no obvious cracks or significant gaps in concrete joins). Several motors / engineer parts (new) were also stored in the vicinity;
- Some of the wall / above ground mounted metal oils drums were connected to overhead oil distribution lines which directed oils to the outside wall of the oil store in the main workshop area. Additional smaller volumes (<20 L) of coolants, brake fluids, aerosols etc were stores in shelving or on the concrete floor (not bunded). Minor surface staining and oil (recent spill) was observed at the surface (Figure 20);
- Hydrocarbon (oil/grease) staining and seepage was observed on the exterior areas to the oil store (i.e. southern-eastern corner of main servicing building) (Figure 18 and Figure 19). The staining was most obvious on the southern side, and extended along the concrete and up the cement block wall. A minor gap was observed in one of the masonry brick (Figure 19)). On the eastern side, the staining appeared to have seeped between the concrete floor and metal wall on to the adjacent asphalt pavement;

- A former flammable liquids store, adjoining the warehouse on the northern side was present however, was being used for storage of general tools and equipment rather than hazardous goods (Figure 21).
- One petrol underground fuel storage tank (UST), one fuel bowser and an electronic card reader and fuel vent pipe (active) were located to the east and upgradient of the warehouse (Figure 25). Minor surface staining was apparent to the surface concrete. No groundwater wells were located in the vicinity;
- Concrete floored vehicle wash bay, adjoining the warehouse on the southern side (Figure 24). The drains are directed to the GPT upgradient of the surface water dam;
- Detailing workshop in the southern portion of the site (Figure 26 and Figure 27). The floor was painted concrete and was observed to be wearing in trafficked areas. There were no obvious indicators of gross spills or staining on the surface. The drains are directed to the GPT upgradient of the surface water dam. Vehicle hoists were present. No in-ground inspection pits were observed.
- Likely presence of significant cut/fill beneath structures and paved areas;
- The surface water in the sediment dam immediately downslope of the developed area was sightly turbid brown with no obvious indicators of gross contamination (staining / slicks). Surface water was not flowing at the time. Some algal growth was present on the surface suggesting the possible presence of elevated nutrients. Refer Section 10.2 for field screening of surface water;
- There was a surface water lagoon in the southern portion of the site (Figure 29). The surface water body was sightly turbid brown with no obvious indicators of gross contamination (staining / slicks / algal growth). Surface water was not flowing at the time. Refer Section 10.2 for field screening of surface water;
- Water storage tank adjacent to the sediment dam in the southern portion of the site (Figure 31).

Site observations suggested the general absence of gross contamination for exposed soils at the site i.e. no obvious indications of:

- Staining / odours in areas of exposed surface soils (silty topsoils in garden beds; silty clay soils in grassed areas on the northern side of the surface water body);
- Potential asbestos containing materials (ACM) at the surface or in areas of exposed retaining wall backfill;
- Obvious indications of pesticide spraying or distressed vegetation.

It is noted that a much of the site was covered by concrete or buildings. Inspection of retaining wall backfill was limited to accessible areas.

Site features are annotated on Drawing 1 Appendix E.

Figure 12: Showroom in the northern portion of the site, looking east.

Figure 13: Warehouse in the central portion of the site, looking south-east.

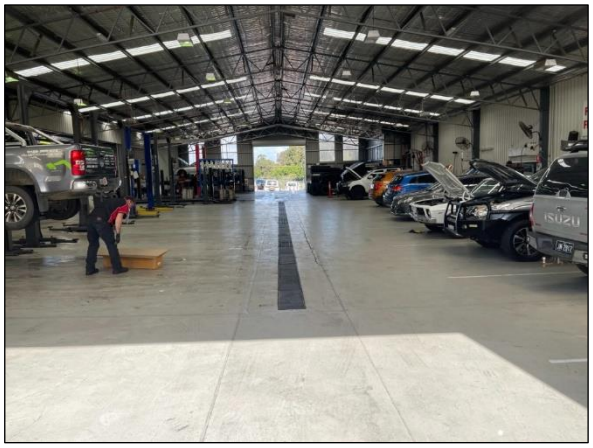


Figure 14: Warehouse floor, looking south.

Figure 15: Parts storage within warehouse.

Figure 16: Engine storage within warehouse.

Figure 17: Oil storage within warehouse.

Figure 18: Staining on asphalt surface and masonry side wall of oil store

Figure 19: Staining on surface and masonry side wall of oil store

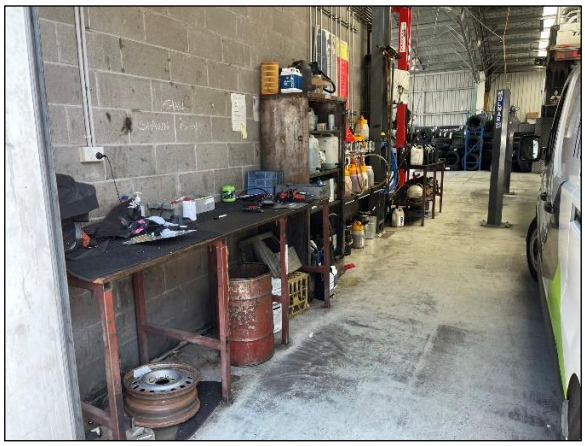


Figure 20: Receipt area for overhead oil distribution line (minor oil on surface)

Figure 21: Former flammable liquids storage, northern side of warehouse

Figure 22: Former flammable liquids storage, northern side of warehouse

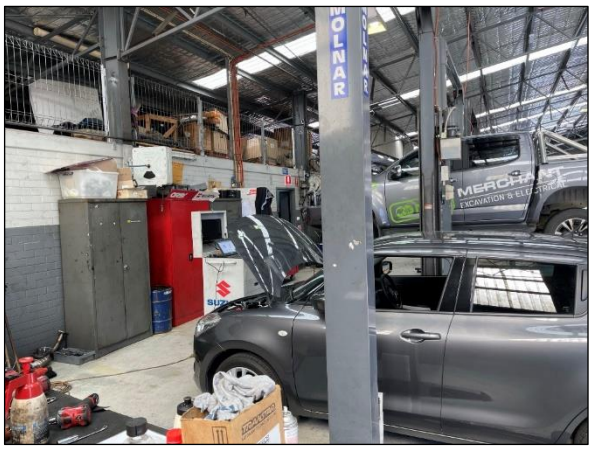


Figure 23: Main workshop / servicing building and mezzanine level

Figure 24: Wash bay attached to warehouse, looking north.

Figure 25: Bowser and UST location, looking north-east.

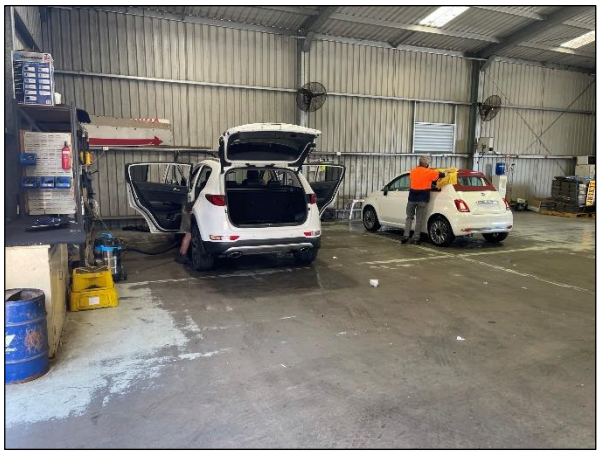


Figure 26: Detailing workshop in the southern portion of the site, viewed from eastern entrance

Figure 27: Detailing workshop in the southern portion of the site, looking north-west.

Figure 28: Retaining wall, between workshop and showroom, looking east. Backfilled with natural gravels (blue metal gravel)

Figure 29: Lagoon in the southern portion of the site, looking south.

Figure 30: Above grade fill platform in the southern portion of the site, looking north.

Figure 31: Water storage tank adjacent to the sediment dam (background), south of main developed area, looking west. Receives surface water runoff from main site (rainwater etc). Discharge from dam to surface water body

6.2 Discussion with Site Personnel

Discussions were held with Vicki Trotter (owners of KTMG), who have owned/operated the site since 1972 under several business entities (presently Gratemat Pty Ltd). Discussions focused on known site activities with the following key information provided:

- At the time of purchase in 1994, the site was vacant comprising grassed paddocks with the surface water body in the southern part of the site;
- The site buildings were constructed for the current usage (showroom/office in the northern portion and workshop/service centre in the central portion of the site);
- Importation of soils / materials is likely to have occurred during site development, such as to raise site levels or for pavement construction. Details regarding constriction and importation of fill materials are not known (no records identified);
- The underground fuel tank is likely to have been installed at the time of site development (late 1990s) for site use (not commercial service station):
    - The tank is 11,000 L and contained unleaded petrol (currently in use);
    - The tank has been pressure tested and no leaks were detected;
    - Records of registration with Safe Work NSW are unknown;
    - There are no known spills or fuel losses;
    - The area is not bunded;
- There has been no demolition of buildings. Several building additions / improvements have been undertaken at times including:

  - New detailing building in the southern part of the site (~2010) (BA/DA records were not identified in Section 5.4). The site was raised including filling, construction of retaining walls and new concrete slabs. Reports related to works have not been identified;
  - Additions to the southern part of the main work shop building in 2016 and 2017. The former wash bay became the new oil store, and a new covered wash down bay was added to the southern-wester corner in 2017 (BA/DA records identified in Section 5.4);
- A hazardous materials assessment has not been undertaken for existing site buildings. Asbestos is not known to be present in the buildings;
- A water collection tank collects site runoff prior to inflow to the site dam. The tank was installed as part of 2010 works and at the request of NSW EPA due to the proximity of the Telarah Lagoon, primarily to limit surface water flow volume . Inspection has been undertaken by EPA three-monthly;
- Waste oil storage etc is in designated areas. The oil storage area is fully bunded with a 3000 L capacity. No overflows are known to have occurred. The tank / bund is cleaned out approximately four times per year;
- All wastes at the site (waste oil, general waste batteries etc) are disposed off-site by third party contractors;
- There are no additional in ground tanks / sumps (other than waste oil tank and unleaded UST);
- Maintenance of gardens / grasses areas in the south comprises mowing only.

7. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future ie: it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Potential Sources

Based on the current investigation, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

- S1: Fill: Associated with raising/levelling the site (historic and more recent for redevelopment).
  - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphorus pesticides (OPP) and asbestos.
- S2: UST, associated pipework and bowser.
  - COPC include lead, TRH, BTEX, PAH;
- S3: Underground waste oil tank, automotive oils coolant storage area and associated pipework (former wash down bay);
  - COPC include metals, TRH, BTEX, PAH, PCB, solvents and VOC.
- S4: Washdown bay:

  - COPC include metals, TRH, BTEX, solvents and VOC.
- S5: Storage of oils, paints, thinners, coolants and other automotive goods;
  - COPC include metals, TRH, PAH, BTEX, PCB, solvents and VOC.
- S6: Carparking, drips / spills leaks (former unsealed carpark areas):
  - COPC include TRH, BTEX, PAH, metals, PCB.
- S7: Surface water and sediments within southern portion of the site (impacts from on-site spills/leaks and migration from upslope developments):;
  - COPC include TRH, BTEX, PAH, metals, OCP, OPP, PCB, VOC, nutrients.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current and future users [workers, customers];
- R2: Maintenance workers;
- R3: Adjacent site users [residential and commercial premises].

The following potential environmental receptors have been identified:

- R4: Surface water and aquatic ecology [site dam, site surface water body and Telarah Creek];
- R5: Groundwater; and
- R6: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours;
- P3: Surface water and sediment run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Inhalation, ingestion and absorption.
- P7: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

A ‘source–pathway–receptor’ approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S7) and receptors (R1 to R6) are provided in below Table 4.

Table 4: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill: Metals, TRH, BTEX, PAH, OCP/OPP, PCB and asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current and future users [workers, customers] R2: Maintenance workers	An intrusive investigation is recommended to assess possible contamination including testing of the soils, groundwater and sediment.
	P2: Inhalation of dust and/or vapours	R3: Adjacent site users [residential / commercial premises].	
	P3: Surface water and sediment run-off P4: Lateral migration of groundwater providing base flow to water bodies	R4: Surface water and aquatic ecology [Telarah Lagoon]	
	P5: Leaching of contaminants and vertical migration into groundwater	R5: Groundwater	
	P6: Inhalation, ingestion and absorption	R6: Terrestrial ecology.	
S2: UST, Lead, TRH, BTEX, PAH, and VOC S3: Underground waste oil tank, metals, TRH, BTEX, PAH and VOC	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current and future users [workers, customers] R2: Maintenance workers	
	P2: Inhalation of dust and/or vapours	R3: Adjacent site users [residential and commercial premises].	
	P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R4: Surface water and aquatic ecology [site dam, surface water body and Telarah Creek]	
	P5: Leaching of contaminants and vertical migration into groundwater	R5: Groundwater	
	P6: Inhalation, ingestion and absorption	R6: Terrestrial ecology.	

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S4: Washdown bay, metals, TRH, BTEX, solvents and VOC S5: Storage of oils, paints, thinners: metals, TRH, PAH, BTEX, PCB, solvents and VOC S6: Carparking, drips / spills leaks (former unsealed carpark areas):	P1 : Ingestion and dermal contact; P6: Inhalation, ingestion and absorption.	R1: Current and future users [workers, customers]; R2: Maintenance workers	An intrusive investigation is recommended to assess possible contamination including testing of the soils, groundwater and sediment.
	P2: Inhalation of dust and/or vapours	R3: Adjacent site users [residential and commercial premises]	
	P3: Surface water and sediment run-off; P4: Lateral migration of groundwater providing base flow to water bodies	R4: Surface water and aquatic ecology [site dam, surface water body and Telarah Creek]	
	P5: Leaching of contaminants and vertical migration into groundwater	R5: Groundwater	
	P7: Contact with terrestrial ecology.	R6: Terrestrial ecology	
S7: Surface water and sediments within dam/ surface water body: TRH, BTEX, PAH, metals, OCP, OPP, PCB and VOC.	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current and future users [workers, customers] R2: Maintenance workers	
	P3: Surface water and sediment run-off; P4: Lateral migration of groundwater providing base flow to water bodies	R4: Surface water and aquatic ecology [site dam, surface water body and Telarah Creek] R5: Groundwater	

8. Sampling and Analysis Quality Plan

8.1 Data Quality Objectives

The preliminary investigation was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The DQO process is outlined in Appendix C.

8.2 Soil Sampling Rationale

Based on the CSM and DQO the following sampling rationale was adopted.

A judgemental sampling strategy to determine borehole locations was adopted for the PSI. Locations were based on site history information, access and the CSM with the rationale provided below. Borehole locations are shown on Drawing 1 in Appendix E.

Bore 101	Assess general soil and fill conditions (S1). Assess condition of soils downgradient of wash bay and main workshop / servicing building (S3, S4).
Bore 102 and 103	Assess general soil and fill conditions (S1). Assess condition of soils in former unsealed carparking area and downgradient of detailing workshop (S4, S5, S6).
Bore 104	Assess condition of soils down gradient of oil store and waste oil tank / former wash bay (S3, S4, S5).
Bores 105 to 107	Assess condition of soils and groundwater near UST and associated infrastructure (down gradient of tank, near bowser) (S2).
Bore 108 and 109	Assess general soil conditions across site and from possible upgradient sources (S1 and S7).
Sediment sample S1	Assess condition of sediments in on site sediment dam which then overflows to site surface water body (S7).

Soil samples were collected from each borehole at the surface and approximately 1.0 m thereafter, and changes in lithology or signs of contamination. At this stage a vapour assessment has not been undertaken for the site (i.e. to assess S2 to S7), however, the preliminary assessment included PID screening of soil samples from the boreholes and groundwater wells.

The general sampling methods are described in the field work methodology, included in Appendix C.

8.3 Sediment Sampling Rationale

In order to provide a preliminary assessment of sediment conditions, sediment sampling was undertaken at one location (S1). Location S1 was located in the on-site dam which receives surface water runoff from the site. Surface water at the dam then infiltrates / overflows to the surface water dam in the southern part of the site. The sediment sample provided data on the concentration of contaminants in sediment downgradient of the main developed area of the site.

The general sampling methods are described in the field work methodology, included in Appendix C.

8.4 Groundwater Sampling Rationale

In order to assess the current groundwater contamination status downgradient of the USTs and evaluate whether the current UST use have impacted on groundwater, sampling from two monitoring wells (Bores 105 to 106) was undertaken.

Bores 105 and 106 were located downgradient of the fuel tank and bowser. The boreholes provided data on the concentration of contaminants in groundwater downgradient of UST infrastructure at the site.

The general sampling methods are described in the field work methodology, included in Appendix C.

8.5 Surface Water Screening Rationale

Preliminary surface water screening was undertaken to assess the general characterises of surface water. Monitoring was limited to safely accessible locations.

Screening locations comprised the on-site dam (SW1) which receives site surface water runoff, . the under road culvert (SW2) which receives flows from upgradient sites and the downgradient location which flows to Telarah Lagoon (SW3). Screening was undertaken using a hand held calibrated meter.

9. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation are informed by the CSM (Section 7) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic commercial / industrial land use scenario and freshwater ecological criteria. The derivation of the SAC is included in Appendix C and the adopted SAC are listed on the summary analytical results tables in Appendix B.

10. Field Work

10.1 Soil

The subsurface conditions encountered at the test locations are presented in detail in the borehole logs in Appendix A. Fieldwork methodology is presented in Appendix C. These should be read in conjunction with the accompanying notes in Appendix A, which explain the descriptive terms and classification methods used in the logs.

The subsurface conditions encountered within the boreholes are summarised in Table 5.

Table 5: Summary of Subsurface Conditions

Depth (m)		Stratum	Description
From	To		
Bore 101			
Surface (0.0)	0.13/0.16	Concrete	Pale grey. Bore 101 to 104 only.
Surface (0.0)	0.02/0.06	Asphalt	Black. Bore 105 to 109 only.
0.02/0.16	0.3/0.6	Fill / Sandy Gravel	Dark brown / brown / grey.
0.16/0.55	1.2/3.7	Fill / Silty Clay / Silty Sand / Gravel	Generally brown / dark brown with various inclusions see logs for details. Bore 101 to 104 only.
0.02/0.03	0.6/1.1	Fill / Gravelly Clay	Low plasticity, brown, gravel is crushed natural rock. Bore 108 and 109 only.
0.3/3.7	1.0(1)/5.0(1)	Silty Clay	High plasticity, brown. All boreholes except Bore 103.
1.5/3.1	3.0(1)/5.0(1)	Siltstone	Extremely weathered, grey and brown / grey and pale orange. Bore 101 and Bores 104 to 108 only.

Notes to Table 5:
(1) Termination depth of bore

Groundwater was not observed in any of the boreholes during the time that they remained open.

It should be noted that groundwater levels are affected by factors such climatic conditions and soil permeability and will therefore vary with time.

There were no obvious indicators of gross contamination (i.e. staining, odours) in boreholes and sediments to the depths investigated. There were no observations of potential asbestos containing materials (ACM) in bores or in areas of exposed surface soils.

Observations of anthropogenic inclusions within fill comprised:

- Concrete (gravel/cobble sized), in fill at Bore 102/0.85-0.95 m and Bore 103/1.55-1.6 m;
- Brick in fill at Bore 103/1.2-1.3 m;

- Asphalt in fill at Bore 102/2.9-3.0 m.

Whilst the inclusions are not potential contaminants, they are indicative of the possible presence of hazardous building materials, such as asbestos, synthetic mineral fibres (SMF) and lead.

The results of PID screening on soil samples are shown on the borehole logs in Appendix A. PID screening indicated the general absence of gross volatile impacts within the screened soil samples from the boreholes (i.e. readings less than equal to 10 ppm). Slightly elevated readings of up to 25 ppm were identified in Bore 106 to a depth of 4 m however was not identified at 4.5 m. There were no observations of gross contamination such as odours/staining within the boreholes.

The results of PID screening of well headspace and water samples are shown in Section 10.3 below.

10.2 Sediment and Surface Water

The results of sediment sampling at S1 are shown in Table 6. Field screening of surface waters was undertaken at locations SW1 to SW3 to provide preliminary information on water quality. The results are shown in Table 7.

Table 6: Summary of Sediment Conditions – Sample S1

Depth (m)		Stratum	Description
From	To		
0	0.2 (1)	Silty SAND	Dark brown, sand is fine to medium grained, with roots, rootlets, wet. 0.2 m surface water above sample location

(1) Termination depth of bore

Table 7: Field Screening of Surface Waters (9 August 2021)

Test Location	Description	PID (ppm)	pH	EC (µS/cm)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Temp. (°C)	Comments
SW1	Site sediment dam	<1	8.2	432	131	4.3	51	12.4	Not flowing, clear, slight sulfur odour, presence of algal growth on surface.
SW2	Southern surface water body	<1	7.8	695	138	7.5	130	14.2	Not flowing, slightly turbid brown
SW3	Culvert near Telarah Lagoon	<1	8.1	600	194	10.4	190	14.4	Not flowing, slightly turbid brown

Notes to Table 7:
DO - Dissolved Oxygen
EC - Electrical Conductivity
NTU - Nephelometric Turbidity Units
ORP - Oxidation Reduction Potential
ppm – parts per million

The results of surface water field testing indicated fresh to slightly alkaline conditions, low salinity, oxidising conditions and moderate to high oxygen levels. There were no obvious indications of gross contamination at surface water sample locations (i.e. absence of staining, odours, hydrocarbon slick/sheen etc).

A slight sulfur odour was noted during sediment sampling at S1 which may be indicative of organics within the general dam areas. There were no observations of gross contamination in the sediment sample or the surface waters sampled (i.e. no hydrocarbon odours, staining, free product) during sampling.

10.3 Groundwater

The results of groundwater gauging, PID screening and field parameter readings conducted on 17 August 2021 are summarised in Table 8. There were no observations of obvious gross contamination (odours/free product) within wells.

Table 8: Groundwater Field Parameters - 17 August 2021

Well ID	Easting	Northing	RL TOC (AHD)	Date Sampled	Depth to Groundwater Below TOC (m)	RL GW Level (AHD)	PID Well Headspace (ppm)	PID GW Headspace (ppm)	Thickness of free product (mm)	pH (pH units)	EC (mS/cm)	ORP (mV)	DO (ppm)	Turbidity (NTU)	Temp (°C)	Comments
105	363509.6	6378056.1	8.62	17/08/2021	3.62	5.00	<1	<1	ND	7.6	3.34	102	4.1	>1000	19.2	Very turbid, brown, no odour
106	363505.3	6378057.7	8.42	17/08/2021	3.40	5.02	<1	<1	ND	7.1	9.86	1113	7.2	>1000	19.6	Very turbid, brown, no odour

Notes to Table:

EC - Electrical Conductivity

ORP - Oxidation Reduction Potential

DO - Dissolved Oxygen

NTU - Nephelometic Turbidity Units

ND - Not detected (i.e. <1.2 mm)

TOC - Top of Casing

Ground surface level is approximately equal to TOC (i.e. zero stickup)

11. Laboratory Analytical Results

11.1 Program

Laboratory testing for the preliminary assessment of soils was undertaken by Envirolab Services Pty Ltd, a NATA registered laboratory. Analytical methods used are shown in the laboratory sheets attached.

A total of sixteen discrete soil samples (including one QA sample and one sediment sample) were selected for testing as part of the PSI. The soil samples from boreholes and the sediment sample were analysed for the following potential contaminants:

- Metals: arsenic (As), barium (Ba) , beryllium (Be), boron (B), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), selenium (Se) and zinc (Zn);
- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethyl Benzene, Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Polychlorinated Biphenyls (PCB);
- Organochlorine and Organophosphorus Pesticides (OCP/OPP).

Three samples from the boreholes were also analysed for asbestos where filling or anthropogenic materials were identified.

Two groundwater samples were analysed for the following potential contaminants:

- Dissolved metals: As, Cd, Cr, Cu, Pb, Hg, Ni, Zn, Mn;
- TRH;
- BTEX;
- PAH (low level);
- OCP/OPP;
- PCB.

11.2 Results

The results of laboratory analysis are summarised in the Tables B1 to B4 in Appendix B.

The laboratory certificate(s) of analysis, chain of custody and sample receipt information are presented in Appendix C.

12. Discussion

12.1 Soils

Sixteen soil samples were analysed to provide a preliminary assessment of contaminant concentrations in soil for the identified potential contaminants of concern in those areas. The results of the laboratory testing indicated the following:

- BTEX, OCP, OPP, PCB and asbestos were not detected above the laboratory reporting limits;
- Hydrocarbon concentrations were identified in soils at:
  - Bores 108/1.0 m (TRH/PAH) in the northern part of the site;
  - Bore 102/3.0 m downgradient of the main workshop / detailing workshop and 103/1.5 m downgradient of the detailing workshop;
  - Bore 105/0.5 m; one of the three four bores drilled to target the UST (downgradient of tank);
- The tested soils were within the following human health guidelines:
  - NEPC (2013) human health investigation levels (HIL) for commercial/industrial land use (i.e. HIL D);
  - NEPC (2013) human health screening levels (HSL) for commercial/industrial land use with the exception of benzo(a)pyrene (PAH) at Bore 108/1.0 m;
  - NEPC (2013) management limits for commercial/industrial land use;
  - Most tested soils were within NEPC (2013) ecological investigation and screening limits for commercial/industrial land use with the exception of Bore 108/1.0 m for benzo(a)pyrene.
- Asbestos was not visually detected by observation or laboratory testing in selected samples.

Brief review of the PAH profile against known PAH sources (www.pahsourceanalyst.com.au), indicates that the contaminant concentrations at Bore 108/1.0 m are indicative of ash materials. Ash was generally not observed in the soils retrieved from the boreholes during drilling, and therefore may be present in trace amounts intermixed in fill.

Given that the soils at Bore 108/1.0 m are beneath the pavement adjacent to the showroom, the risk of direct contact with soils is considered to be low. Furthermore, the upslope areas of the site are not considered to be an area of ecological significance based on its current site use and therefore ecological exceedances are not considered to be significant due to the current land use.

Based on the results, the tested soils are generally considered to be suitable to remain on site from a contamination perspective.

12.2 Sediment

One sediment sample (S1) was analysed to provide a preliminary assessment of contaminant concentrations in sediments in the southern portion of the site within the site sediment dam. The results of the laboratory testing indicated the following:

- TRH, BTEX, PAH, OCP, OPP, PCB and asbestos were not detected above the laboratory reporting limits;

- The tested soils were within toxicant default guideline values for sediment quality (WQA, 2019).

The results suggest the absence of significant impact to sediment in the site dam, based on the limited testing conducted.

12.3 Preliminary Waste Classification

As shown in Table B2 in Appendix B, most contaminant concentrations for the analysed soil samples were below the NSW EPA (2014) contaminant thresholds (CT1) for 'General Solid Waste' (GSW). Elevated contaminant concentrations were identified above CT1 / CT2 criteria as follows:

- Bores 103/1.5 m classified as 'Restricted Waste' based on elevated B(a)P above CT1;
- Bore 106/2.0 m classified as 'Restricted Waste' based on elevated nickel above CT1;
- Bore 108/1.0 m classified as 'Hazardous Waste' based on elevated arsenic above CT2 and TRH above CT1.

Further leachability testing has not been undertaken and may allow reclassification of the soils as GSW or Restricted Waste (Bore 108/1.0 m).

12.4 Groundwater

Two water samples were analysed from the monitoring wells installed at the site to provide a preliminary assessment of contaminant concentrations in groundwater in the vicinity of the UST in the eastern portion of the site. The results of the laboratory testing indicated the following:

- PAH, TRH, BTEX were not detected above laboratory reporting limits;
- The tested groundwater was within the following guidelines:
  - ANZG (2018) freshwater toxicant DGV for 95% protection in fresh water;
  - NEPC (2013) health screening levels (HSL) for commercial/industrial land use (i.e. HSL D) for vapour intrusion in sand;
- Most groundwater results were within ANZG (2018) freshwater toxicant default guideline values for 95% protection in freshwater except for Bore 105 which contained slightly elevated copper.

On the basis of the testing conducted, the potential for gross groundwater impact from the active UST and associated infrastructure is considered to be low.

It is noted that copper is not a typical contaminant associated with underground fuel storage, and as such the minor exceedance may be associated with general site conditions. Elevated metals in groundwater are not uncommon and may be representative of background / urban environments.

12.5 Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) results are included in the laboratory report in Appendix C. Based on the results of the field and laboratory QC, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment. Further detail is presented in Appendix C.

13. Conclusions and Recommendations

The PSI and preliminary soil, groundwater and sediment testing was undertaken to assess the potential for contamination at the site based on past and present land uses and to comment and the need for further investigation and/or management with regard to continued use for commercial/industrial purposes.

It is noted that the preliminary subsurface investigation focused on the identified contamination risk areas within the developed area of the site currently in use. These included the following potential sources of contamination: fill materials, UST waste oil tank / chemical storage, drips/spills at surface, wash bay and possible off-site impacts from development. A preliminary assessment of groundwater in the vicinity of the UST was also conducted, together with the assessment of sediment quality at the sediment dam immediately downgradient of the developed area.

The results of the assessment indicated the following:

- Presence of extensive fill across the site up to 3.7 m deep in the southern developed part of the site. Materials were variable based on observations during drilling and the results of testing of selected soils;
- The general absence of gross contamination at the test locations and depths assessed based on field observations and laboratory testing of selected soil samples. This included areas downgradient of active UST, waste oil store and washdown bay;
- Soil contamination concentrations were generally within the adopted site assessment criteria for commercial/industrial land use with the exception of benzo(a)pyrene (PAH) at Bore 108/1.0 m within fill which slightly exceeded commercial/industrial health screening levels. The source of elevated contamination has not been identified and therefore may be indicative of fill in the northern part of the site;
- Sediment contamination concentrations were within the adopted site assessment criteria;
- Groundwater contamination concentrations were within the adopted fresh water site assessment criteria with the exception of minor elevated copper at Bore 105. Elevated metals in groundwater are not uncommon and may be indicative of general site conditions. The results indicate the absence of gross impact and are generally not considered significant;
- Asbestos was not detected by observation or laboratory testing in selected soil samples. Owing to the presence of fill at the site, and presence of building materials in fill, there is a risk of hazardous building materials (HBM) including asbestos in unobserved or untested parts including UST backfill materials;

Investigation near the UST (three bores) and the waste oil tank/ former wash bay (one bore only) were necessarily limited by the underground infrastructure and safe set back distances.

Impact to soil was not identified downgradient of the waste oil tank / former wash bay at Bore 104, however, observations indicated hydrocarbon/oil staining at the surface of the building perimeter. Residual impacts to soils are likely to be present, however, such impacts may be localised rather than widespread. The possible presence or the extent of such impacts has not been determined.

Hydrocarbon impact to soil was not identified within bores downgradient of the active UST. Based on our experience, however, residual impacts may be present in the vicinity of underground fuel tanks and associated infrastructure (i.e. tank backfill, fuel /service lines). This may include residual impacts to soil and possible impacts to perched groundwater, if present.

The following is recommended:

- Review / audit of the current UST loss monitoring procedures, leak detection of UPSS system, record keeping and environmental management of the area with reference to regulatory and statutory requirements. This should include installation of a third groundwater monitoring well and biannual groundwater monitoring to align with NSW EPA *Underground Petroleum Storage Systems Regulation* (NSW EPA, 2020b).
- Removal of the UST and associated infrastructure, if proposed, should be undertaken with reference to NSW EPA (2014c) *Technical Note: Investigation of Service Station Sites*;
- Improvement of existing environmental controls including clean up of localised hydrocarbon spills within the waste oil store to minimise the potential for migration / overflows and surface water run-off.

It is noted that a number of sources/areas of potential contamination were identified and limited testing has been conducted across the developed area of the site. Variable fill materials, sediments and residual impacts may be present within the site. Further assessment would be required to assess the possible presence, extent and implications (if any) of the identified potential sources of contamination.

Based on the results of the preliminary site investigation and the results of limited contamination testing of soils, groundwater and sediment, the current facility is considered to be suitable for continued commercial/industrial use with respect to contamination.

14. References

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australia and New Zealand Environment and Conservation Council.

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

DP. (1995). *Report on Geotechnical Investigation, Proposed Motor Vehicle Sales and Service Facility, New England Highway, Maitland.* Ref: 18412.00: Douglas Partners Pty Ltd.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2014a). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW EPA. (2014b). *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014.* NSW Environment Protection Authority.

NSW EPA. (2020a). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

NSW EPA. (2020b). *Underground Petroleum Storage Systems - Guidelines for implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019.* Doc Ref: EPA 2020P2700: NSW Environment Protection Authority.

WQA. (2019). *Toxicant default guideline values for sediment quality.* Water Quality Australia.

15. Limitations

Douglas Partners (DP) has prepared this report for this project at Bungaree Street, Maitland, New South Wales with reference to DP's proposal 207251.00.P.001.Rev0 dated 23 July 2021 and acceptance received from Eagers Automotive Limited dated 26 July 2021. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Eagers Automotive Limited for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the environmental and groundwater components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the site, or in filling materials at the test locations sampled and analysed. Building demolition materials, such as concrete, were located in below ground filling and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

Douglas Partners Pty Ltd

Appendix A

About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Borehole logs (Bores 101 to 109)
Test Pit Logs (Test Pits 1 to 10)

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

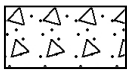
Symbols & Abbreviations

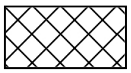
Graphic Symbols for Soil and Rock

General

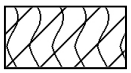

Asphalt

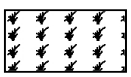

Road base

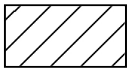

Concrete

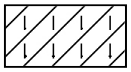

Filling

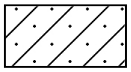
Soils


Topsoil

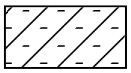

Peat

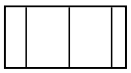

Clay

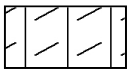

Silty clay

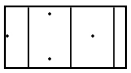

Sandy clay

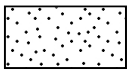

Gravelly clay

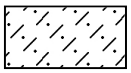

Shaly clay

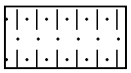

Silt


Clayey silt


Sandy silt

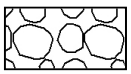

Sand

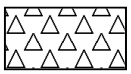

Clayey sand


Silty sand


Gravel

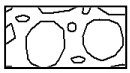

Sandy gravel


Cobbles, boulders

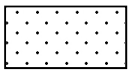

Talus

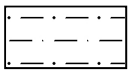
Sedimentary Rocks

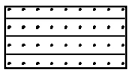

Boulder conglomerate

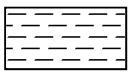

Conglomerate


Conglomeratic sandstone

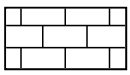

Sandstone


Siltstone

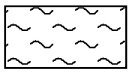

Laminite

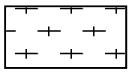

Mudstone, claystone, shale

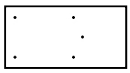

Coal


Limestone

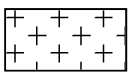
Metamorphic Rocks

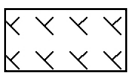

Slate, phyllite, schist

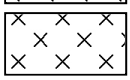

Gneiss

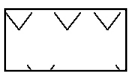

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 6.35 AHD
EASTING: 363458.2
NORTHING: 6378038.2
DIP/AZIMUTH: 90°/--

BORE No: 101
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.16	CONCRETE - Pale grey, subangular aggregate up to 30mm							
	0.25	FILL / SANDY GRAVEL (GP) - Dark brown, gravel is fine sized subangular to subrounded (rock), sand is fine to coarse grained, moist		D	0.2	E			
		FILL / SILTY CLAY (CH) - Medium plasticity, brown, trace subangular to subrounded gravel (rock), W=PL, stiff		D	0.5	E	pp = 260 PID <1		
	1			D	1.0	E	pp = 160 PID <1		1
	1.2	SILTY CLAY (CH) - High plasticity, brown trace fine grained sand, W=PL, very stiff			1.5		pp = 250-280		
	2			D	2.0	E	pp = 250-280 PID <1		2
					2.5		pp = 200-300		
		From 2.6m, pale grey, hard		D	2.7	E	pp = 300 PID <1		
	2.8	SILTSTONE - Grey and pale orange		D	2.9	E	pp >400 PID <1		
	3 3.0	Bore discontinued at 3.0m, refusal on rock							3
	4								4
	5								5

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased
TYPE OF BORING: 150mm concrete core 0m to 0.16m, geoprobe push tube 0.16m to 3m
WATER OBSERVATIONS: No free groundwater observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 7.59 AHD
EASTING: 363472.7
NORTHING: 6378008.6
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.16	CONCRETE - Pale grey, subangular aggregate up to 30mm							
		FILL / SANDY GRAVEL (GP) - Brown, gravel is fine sized, subangular to subrounded (rock) sand is fine to coarse grained, moist		D	0.5	E	PID <1		
	0.55	FILL / SILTY CLAY (CI) - Medium plasticity, dark brown, trace fine to medium sized subangular gravel (rock), W=PL, stiff							
		From 0.85m to to 0.95m, concrete cobble		D	1.0	E	pp = 350-400 PID <1		
				D	2.0	E	pp = 150 PID <1		
					2.5		pp = 150		
		From 2.9m to 3m, trace asphalt		D	3.0	E	pp = 150 PID <1		
		From 3.1m to 3.15m with organics (wood, roots)							
					3.5		pp = 210		
	3.7	SILTY CLAY (CM) - High plasticity, dark brown, W=PL, stiff		D	4.0	E	pp = 140 PID <1		
		From 4.5m, with fine grained sand			4.5		pp = 110		
	5.0	Bore discontinued at 5.0m, limit of investigation		D	5.0	E	pp = 150 PID <1		

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased

TYPE OF BORING: 150mm concrete core 0m to 0.16m, geoprobe push tube 0.16m to 5m

WATER OBSERVATIONS: No free groundwater observed during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 7.45 AHD
EASTING: 363496.8
NORTHING: 6377981
DIP/AZIMUTH: 90°/--

BORE No: 103
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.13	CONCRETE - Pale grey, subangular aggregate up to 30mm							
	0.35	FILL / SANDY GRAVEL (GP) - Brown, gravel is fine sized subangular to subrounded (rock), sand is fine to coarse grained, moist		D	0.2	E	PID <1		
		FILL / SILTY CLAY (CI) - Medium plasticity, dark brown, trace fine to medium sized subangular gravel (rock), W<PL, stiff to very stiff		D	0.5	E	pp = 350-400 PID <1		
		From 1.2m to 1.3m, brick		D	1.0	E	pp = 300 PID <1		
	1.6	From 1.55m to 1.6m, concrete		D	1.5	E	pp = 250 PID <1		
		Bore discontinued at 1.6m, refusal on concrete							

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased

TYPE OF BORING: 150mm concrete core 0m to 0.13m, geoprobe push tube 0.13m to 1.6m

WATER OBSERVATIONS: No free groundwater observed during drilling

REMARKS: Unable to move due to service

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 8.14 AHD
EASTING: 363488.7
NORTHING: 6378035.5
DIP/AZIMUTH: 90°/--

BORE No: 104
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.16	CONCRETE - Pale grey, subangular aggregate up to 30mm							
		FILL / SILTY CLAY (CI) - Medium plasticity, brown with fine sized subangular gravel (rock), W ≤ PL, stiff		D	0.5	E	pp = 200-250 PID <1		
	0.8	FILL / SILTY SAND (SP) - Brown sand, sand is fine to medium grained, moist		D	1.0	E	PID <1		
	1.8	FILL / GRAVEL (GP) - Brown, fine sized subangular		D	1.85	E	PID <1		
	1.9	gravel (rock), trace fine to medium grained sand, moist			2.0		pp = 120-160 PID <1		
		SILTY CLAY (CH) - High plasticity, brown, W=PL, stiff							
					2.5		pp = 200		
		From 2.6m, pale grey grading to rock							
	2.8	Bore discontinued at 2.8m, refusal on rock		D	2.8	E	PID <1		

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased

TYPE OF BORING: 150mm concrete core 0m to 0.16m, geoprobe push tube 0.16m to 2.8m

WATER OBSERVATIONS: No free groundwater observed during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 8.62 AHD
EASTING: 363509.6
NORTHING: 6378056.1
DIP/AZIMUTH: 90°/--

BORE No: 105
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.04	ASPHALT - Black							From 0m to 0.3m, concrete
	0.3	FILL / SANDY GRAVEL (GP) - Grey, gravel is fine to medium sized, subangular to subrounded (rock), sand is fine to medium grained, moist		D	0.2	E	PID = 2		
		SILTY CLAY (CI) - Medium plasticity, grey mottled orange, W<PL, hard		D	0.5	E	pp = 220 PID = 10		From 0m to 1.0m, blank From 0.3m to 0.8m, bentonite
	1			D	1.0	E	pp = 400 PID = 5		
	1.5	SILTSTONE (XW) - Brown and grey							
	2			D	2.0	E	PID = 1		
	3			D	3.0	E	PID = 3		From 0.8m to 5.0m, gravel From 1.0m to 5.0m, 50mm diameter Class 18 PVC
	4								
	5	5.0		D	5.0	E	PID = 5		End cap
		Bore discontinued at 5.0m, limit of investigation							

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased

TYPE OF BORING: Geoprobe push tube 0m to 1m, TC auger 1m to 5m

WATER OBSERVATIONS: No free groundwater observed during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 8.42 AHD
EASTING: 363505.3
NORTHING: 6378057.7
DIP/AZIMUTH: 90°/--

BORE No: 106
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.06	ASPHALT - Black							From 0m to 0.3m, concrete
		FILL / SANDY GRAVEL (GP) - Grey, gravel is fine to medium sized, subangular to subrounded (rock), sand is fine to medium grained, moist		D	0.5	E	PID = 24		From 0m to 1.0m, blank
	0.6	SILTY CLAY (CI) - Medium plasticity, grey mottled orange, W<PL, hard							From 0.3m to 0.85m, bentonite
	1			D	1.0	E	pp = 400 PID = 11		
		From 1.3m, grading to rock							
	1.5	SILTSTONE (XW) - Brown and grey							
	2			D	2.0	E	PID = 25		
	3			D	3.0	E	PID = 16		From 0.85m to 5.0m, sand From 1.0m to 5.0m, 50mm diameter Class 18 PVC
	4			D	4.0	E	PID = 18		
	5	5.0		D	5.0	E	PID <1		End cap
		Bore discontinued at 5.0m, limit of investigation							

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased

TYPE OF BORING: Geoprobe push tube 0m to 1m, TC auger 1m to 5m

WATER OBSERVATIONS: No free groundwater observed during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 8.39 AHD
EASTING: 363506.4
NORTHING: 6378062.2
DIP/AZIMUTH: 90°/--

BORE No: 107
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT - Black							
	0.3	FILL / SANDY GRAVEL (GP) - Grey, gravel is fine to medium sized, subangular to subrounded (rock), sand is fine to medium grained, moist		D	0.2	E	PID = 9.0		
		SILTY CLAY (CI) - Medium plasticity, grey mottled orange, W<PL, hard		D	0.5	E	pp >400 PID = 10		
	1			D	1.0	E	pp >400 PID = 10		1
		From 1.3m, grading to rock		D	1.5	E	pp >400 PID = 10		
	1.6	SILTSTONE (XW) - Brown and grey							
	2			D	2.0	E	PID = 4		2
	3			D	3.0	E	PID = 2		3
	4			D	4.0	E	PID = 4		4
	5	5.0		D	5.0	E	PID = 2		5
		Bore discontinued at 5.0m, limit of investigation							

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased
TYPE OF BORING: Geoprobe push tube 0m to 1.5m, TC auger 1.5m to 5m
WATER OBSERVATIONS: No free groundwater observed during drilling
REMARKS: Tank approximately 2.9m below ground level

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 12.04 AHD
EASTING: 363504.6
NORTHING: 6378098.5
DIP/AZIMUTH: 90°/--

BORE No: 108
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
12	0.02	ASPHALT - Black							
		FILL / GRAVELLY CLAY (CL) - Low plasticity, gravel is fine sized subangular (rock), W ≤ PL, stiff		D	0.2	E	PID <1		
					0.5		pp = 100		
11	1			D	1.0	E	pp = 130-150 PID <1		1
					1.5		pp = 150		
	1.7	SILTY CLAY (CH) - High plasticity, brown to dark brown, W=PL, stiff							
10	2			D	2.0	E	pp = 160-200 PID <1		2
					2.5		pp = 250		
		From 2.8m, pale brown, hard, grading to rock							
9	3			D	3.0	E	pp = 350-400 PID <1		3
	3.1	Bore discontinued at 3.1m, refusal on rock							
8	4								4
7	5								5

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased

TYPE OF BORING: Geoprobe push tube 0m to 3.1m

WATER OBSERVATIONS: No free groundwater observed during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Eagers Automotive Limited
PROJECT: Due Diligence Assessment
LOCATION: Bungaree Street, Maitland

SURFACE LEVEL: 7.48 AHD
EASTING: 363454.1
NORTHING: 6378113
DIP/AZIMUTH: 90°/--

BORE No: 109
PROJECT No: 18412.01
DATE: 4/8/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
7	0.03	ASPHALT - Black							
		FILL / GRAVELLY CLAY (CL) - Low plasticity, gravel is fine sized subangular (rock), W ≤ PL, stiff		D	0.2	E	PID <1		
				D	0.5	E	PID <1		
	0.6	SILTY CLAY (CH) - High plasticity, brown to dark brown, W=PL, stiff							
6	1.0	Bore discontinued at 1.0m, limit of investigation		D	1.0	E	pp = 110-200 PID <1		
5									
4									
3									

RIG: Truck Mounted **DRILLER:** Campbell Drilling **LOGGED:** Lambert **CASING:** Uncased
TYPE OF BORING: Geoprobe push tube 0m to 1m
WATER OBSERVATIONS: No free groundwater observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 1
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
	FILLING: Dark brown, silty, fine to coarse grained sandy fine to medium sized subangular gravel (GP), moist					
0.3	FILLING: Brown, clayey fine grained sandy silt/silty sand (ML/SM), moist to wet		D	0.8		
0.95	At 0.9 m, 300 mm Ø clay pipe					
	CLAY: (CH/CI), very stiff, orange-brown clay with trace fine to medium grained sand		D,pp	1.1	300-350 kPa	
1.6	CLAY: (CH/CI), very stiff, light brown and orange clay with trace fine to medium grained sand		pp	1.8	300-350 kPa	
2.2	SILTY CLAY: (CI), very stiff, grey silty clay		pp	2.4	350-400 kPa	
2.5	SILTSTONE: Very low strength, highly weathered, brown and grey siltstone with some ironstaining		D	2.8		
2.95	Test Pit 1 terminated at 2.95 m.					

RIG: Cat 4WD

LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

Douglas Partners
Geotechnics · Environment · Groundwater

TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 2
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.05	FILLING: Dark brown, silty fine grained sand, (SM), with some clay and abundant rootlets, moist					
	FILLING: Brown, clayey, fine grained sandy silt/silty sand (ML/SM) with trace fine sized subrounded gravel and trace rootlets, moist to wet		D	0.4		
1.0	FILLING: Light brown, clayey fine grained sandy silt/silty sand (ML/SM) with trace fine sized subrounded gravel and trace rootlets, damp to moist		D	1.4		
1.8	SILTY CLAY/CLAYEY SILT: (CL/ML), firm to stiff, dark grey silty clay/clayey silt with trace fine sized subangular gravel		D,pp	2.4	100 kPa	
2.7	SANDY CLAY: (CI), stiff, grey and brown slightly silty fine to medium grained sandy clay with trace fine sized subangular gravel Becoming stiff to very stiff		D,pp	3.3	150–200 kPa	
3.4	Test Pit 2 terminated at 3.4 m.					

RIG: Cat 4WD
LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

Douglas Partners
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TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 3
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.2	TOPSOIL: Dark brown silty fine grained sand (SM), with some clay and abundant rootlets, moist					
	CLAY: (CH/CI), very stiff, orange mottled light brown clay with trace fine to medium grained sand and some roots and rootlets		pp	0.35	350-400 kPa	
0.7	CLAY: (CH/CI), hard, light brown and orange slightly silty clay with some fine to medium sized subangular gravel and abundant roots and rootlets		D,pp	0.85	>400 kPa	
1.8	SILTSTONE: Very low strength, highly weathered, brown and grey siltstone with some ironstaining		D	1.85		
			D	2.5		
3.0	Test Pit 3 terminated at 3.0 m.					

RIG: Cat 4WD
LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

Douglas Partners
Geotechnics · Environment · Groundwater

TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 4
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
	TOPSOIL: Dark brown, fine grained sandy silt (ML), with some medium to coarse sized subangular and subrounded gravel and some rootlets, moist					
0.3	CLAY: (CH/CI), stiff, brown mottled orange clay with trace fine to medium grained sand, and some rootlets		pp	0.5	200 kPa	
0.65	CLAY: (CH/CI), very stiff, orange-brown clay with trace fine to medium grained sand and some rootlets		pp	0.8	300-350 kPa	
1.1	SILTY CLAY: (CI), hard, grey, mottled orange silty clay with abundant rootlets		pp	1.3	>400 kPa	
1.8	SILTSTONE: Very low to low strength, highly weathered, brown siltstone, some fine to medium grained sand		D	2.6		
2.7	Test Pit 4 terminated at 2.7 m.					

RIG: Cat 4WD

LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

Douglas Partners
Geotechnics · Environment · Groundwater

TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 5
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.35	TOPSOIL: Dark brown, fine grained sandy silt (ML), with some medium to coarse sized subangular and subrounded gravel and some rootlets, moist					
	CLAY: (CH/CI), very stiff to hard, orange-brown clay with some fine to medium grained sand and trace fine to medium sized subangular gravel		pp	0.6	250 kPa	
				0.75		
			U_{50}			
1.1			pp	1.1	>400 kPa	
	SILTY CLAY: (CI), hard, light brown silty clay with some fine to medium grained sand and trace fine sized subangular gravel		pp	1.2	>400 kPa	
1.4	SANDSTONE: Very low to low strength, highly weathered, brown and grey sandstone, fine to medium grained sand, some fine to coarse sized subrounded gravel					
1.7	Test Pit 5 terminated at 1.7 m backhoe refusal on low to medium strength sandstone.					

RIG: Cat 4WD

LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

Douglas Partners
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TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 6
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.15	TOPSOIL: Dark brown, silty fine grained sand (SM), with some clay and some medium sized angular gravel and some rootlets, moist to wet			0.2		
	CLAY: (CH/CI), stiff, orange-brown clay with some fine grained sand and trace fine sized subangular and subrounded gravel		pp B	0.3	150-200 kPa	
0.5				0.5		
	SILTY CLAY: (CI), very stiff to hard, light brown and orange silty clay with some fine to medium grained sand and trace fine to medium sized subangular gravel		pp	0.7	200-250 kPa	
				0.8		
			U_{50}			
1.1			pp	1.05	>400 kPa	
	SANDSTONE: Very low to low strength, highly weathered, brown and grey sandstone, fine to medium grained sand, some fine to coarse sized subrounded gravel		D	1.3		
			D	2.1		
2.2	Test Pit 6 terminated at 2.2 m backhoe refusal on low to medium strength sandstone.					

RIG: Cat 4WD

LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

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TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 7
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.1	FILLING: Dark brown, silty fine grained sand (SM), with some clay and some rootlets, moist					
	FILLING: Stiff, brown silty fine to medium grained sandy clay (SC) with some lenses of medium to coarse grained sand and clay		D,pp	0.6	100-150 kPa	
0.95	CLAY: (CH/CI), very stiff, orange-brown clay with trace fine to medium grained sand and trace subangular cobbles to 200 mm			1.0		
			U_{50}			
			pp	1.3	300 kPa	
1.4	SILTY CLAY: (CI), very stiff, light brown and orange silty clay with some fine to medium grained sand		pp	1.6	250-300 kPa	
1.8	SILTSTONE: Low strength, highly weathered, brown siltstone, some fine to medium grained sand					
			D	2.2		
2.3	Test Pit 7 terminated at 2.3 m, backhoe refusal on low to medium strength siltstone.					

RIG: Cat 4WD

LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

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TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 8
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
	TOPSOIL: Dark brown fine grained sandy silt, (ML), with some clay and some fine to coarse sized subangular and subrounded gravel, and with some rootlets, moist					
0.35	CLAY: (CH/CI), very stiff, brown and orange clay with some fine to medium grained sand and some rootlets		pp	0.5	250~300 kPa	
0.75	SILTY CLAY: (CI), very stiff, light brown and orange silty clay with some fine to medium grained sand and trace fine to medium sized subangular gravel		pp	0.8	350~400 kPa	
0.95	SANDSTONE: Very low to low strength, highly weathered, brown and grey sandstone, fine to medium grained sand, some fine to coarse sized subrounded gravel		D	1.6		
1.7	Test Pit 8 terminated at 1.7 m, backhoe refusal on low to medium strength sandstone.					

RIG: Cat 4WD
LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

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TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 9
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
	TOPSOIL: Dark brown fine grained sandy silt, (ML), with some clay and abundant rootlets, moist					
0.3	CLAY: (CH/CI), very stiff to hard, orange-brown clay with some fine to medium grained sand and trace fine to medium sized subangular gravel, and some rootlets			0.3		
			pp B	0.4	250-300 kPa	
			pp	0.6	>400 kPa	
1.1	SILTY CLAY: (CI), hard, light brown and grey mottled orange silty caly with some fine to medium grained sand and trace fine to medium sized subangular gravel and with abundant rootlets		pp	1.2	>400 kPa	
2.2	SILTY CLAY: (CI), very stiff, grey mottled orange silty clay with some medium to coarse sized gravel (siltstone and ironstone fragments) and with abundant roots and rootlets		D,pp	2.3	300-350 kPa	
	At 2.5 m, 400 mm subangular boulder		D	2.5		
3.0	SILTSTONE: Very low strength, highly weathered, brown and grey siltstone with some ironstaining					
3.2	Test Pit 9 terminated at 3.2 m.					

RIG: Cat 4WD

LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials: AWB
Date: 26.10.95

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TEST PIT REPORT

CLIENT: Peter Sullivan & Associations Pty Ltd
PROJECT: Proposed Sales Yard
LOCATION: New England Highway, Maitland

DATE: 6 October 1995
PROJECT No.: 18412
SURFACE LEVEL: Not Measured

PIT No: 10
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.0	TOPSOIL: Dark brown fine grained sandy silt, (ML), with some clay and some rootlets, moist					
	At 0.3 m, some medium to coarse sized subangular and subrounded gravel					
0.4	CLAY: (CH/CI), very stiff, brown mottled orange clay with trace fine to medium grained sand and trace fine to medium sized subangular gravel			0.45		
			B			
			pp	0.6	250-300 kPa	
	From 0.9 m, becoming orange-brown with some medium to coarse sized subrounded gravel					
1.2	SILTY CLAY: (CI), very stiff, light brown and grey silty clay with trace fine to medium sized subangular gravel and with trace roots					
			pp	1.9	250 kPa	
2.4	SANDSTONE: Very low to low strength, highly weathered, brown and grey sandstone, fine grained sand, some fine to medium sized subrounded gravel					
			D	2.7		
2.8	Test Pit 10 terminated at 2.8 m.					

RIG: Cat 4WD

LOGGED: Merifield

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	M Moisture content
B Bulk sample	pp pocket penetrometer kPa
D Disturbed sample	U_x Tube sample (x mm dia.)
HV Hand Vane	Wp Plastic limit (%)

CHECKED
Initials:
Date: 26.10.95

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Appendix B

Table B1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos (Land Use - All Samples)

Table B2: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos (Waste Classification - All Samples)

Table B3: Summary of Laboratory Results – Metals, PAH, TRH (Groundwater)

Table B4: Summary of Laboratory Results – Metals, PAH, TRH, OCP, OPP, PCB (Sediment)

Laboratory Reports (Envirolab Report 275588 & 276099)

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Table B1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos (Land Use - All Samples)

			Metals													TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	Beryllium	Boron	Cobalt	Selenium (Total)	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10) - BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	4	0.4	1	1	1	0.1	1	1	1	1	3	1	2	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05
Sample ID	Depth	Sample Date	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
101	1 m	04/08/2021	7	<0.4	17	12	10	<0.1	19	55	74	1	<3	9	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	370	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
102	1 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	370	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
102	3 m	04/08/2021	5	<0.4	22	15	27	<0.1	15	53	210	<1	<3	9	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.71	1.1	6.9
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	630	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
103	1.5 m	04/08/2021	9	<0.4	9	15	51	<0.1	2	37	130	<1	<3	<1	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	2.3	3.6	26
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	370	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
104	0.5 m	04/08/2021	<4	<0.4	29	33	3	<0.1	21	39	490	<1	3	12	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	260	215	NL	-	1700	3300	3	75	NL	135	NL	165	230	180	NL	370	-	33	40	-	4000	-
D4	0 m	04/08/2021	<4	<0.4	35	25	2	<0.1	20	36	520	<1	<3	12	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	260	215	NL	-	1700	3300	3	75	NL	135	NL	165	230	180	NL	370	-	33	40	-	4000	-
104	0.85 m	04/08/2021	9	<0.4	7	9	2	<0.1	6	29	77	<1	<3	3	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	260	215	NL	-	1700	3300	3	75	NL	135	NL	165	230	180	NL	370	-	33	40	-	4000	-
105	0.5 m	04/08/2021	8	<0.4	16	10	14	<0.1	11	40	56	<1	<3	7	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	0.4
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	260	215	NL	-	1700	3300	3	75	NL	135	NL	165	230	180	NL	370	-	33	40	-	4000	-
106	1 m	04/08/2021	6	<0.4	16	23	12	<0.1	24	79	62	1	<3	9	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	370	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
106	2 m	04/08/2021	6	<0.4	19	19	14	<0.1	47	110	220	2	<3	73	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	630	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
106	4 m	04/08/2021	7	<0.4	20	18	13	<0.1	27	75	220	<1	<3	8	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	NL	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
107	1 m	04/08/2021	9	<0.4	17	12	8	<0.1	21	75	56	3	<3	10	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	370	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
107	4 m	04/08/2021	11	<0.4	18	20	19	<0.1	29	85	210	<1	<3	9	<2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	NL	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
108	1 m	04/08/2021	7	<0.4	15	9	20	<0.1	22	52	320	<1	<3	10	<2	<25	<50	<25	<50	930	210	<0.2	<0.5	<1	<1	<1	33	48	500
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	370	215	NL	-	1700	3300	3	75	NL	135	NL	165	NL	180	NL	370	-	33	40	-	4000	-
109	0.5 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<0.05	<0.5	<0.05
			3000	160	900	-	3600	540	240000	160	1500	1800	730	-	6000	60	400000	480	60000	-	500	-	300000	-	4000	-	10000	-	-	-	170	260	215	NL	-	1700	3300	3	75	NL	135	NL	165	230	180	NL	370	-	33	40	-	4000	-

			OCP											OPP	PCB									Asbestos					
			DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyrifos	Aroclor 1016	Total PCB	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation	Asbestos (300ml)	Asbestos (60 g)
		PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1					0.001	
Sample ID	Depth	Sample Date	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	-	-	-	g	-	-
101	1 m	04/08/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
102	1 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD	NT	NAD	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
102	3 m	04/08/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
103	1.5 m	04/08/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	NAD
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
104	0.5 m	04/08/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
D4	0 m	04/08/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
104	0.85 m	04/08/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
105	0.5 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
106	1 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
106	2 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
106	4 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
107	1 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
107	4 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
108	1 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-
109	0.5 m	04/08/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	NAD
			-	-	3600	640	-	-	640	45	530	-	100	-	2000	-	50	-	80	-	2500	-	2000	-	-	-	7	-	-	-	-	-

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report Blue = DC exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Commercial/ industrial D

HIL D Commercial / Industrial (NEPC, 2013)

HSL D Commercial / Industrial (vapour intrusion) (NEPC, 2013)

DC HSL D Direct contact HSL D Commercial/Industrial (direct contact) (CRC CARE, 2011)

EIL/ESL C/Ind Commercial and Industrial (NEPC, 2013)

ML C/Ind Commercial and Industrial (NEPC, 2013)

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Table B2: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos (Waste Classification - All Samples)

			Metals													TRH					BTEX						PCB							
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	Beryllium	Boron	Cobalt	Selenium (Total)	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 (sum of total hydrocarbons)	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCB
		PQL	4	0.4	1	1	1	0.1	1	1	1	1	3	1	2	25	50	100	100	50	0.2	0.5	1	2	1	3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Depth	Sample Date	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
101	1 m	04/08/2021	7	<0.4	17	12	10	<0.1	19	55	74	1	<3	9	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
102	1 m	04/08/2021																																
102	3 m	04/08/2021	5	<0.4	20	15	27	<0.1	15	53	210	<1	<3	9	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
103	1.5 m	04/08/2021	9	<0.4	9	15	51	<0.1	2	37	130	<1	<3	<1	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
104	0.5 m	04/08/2021	<4	<0.4	29	33	3	<0.1	21	39	490	<1	3	12	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
D4	0 m	04/08/2021	<4	<0.4	30	25	2	<0.1	20	36	520	<1	<3	12	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
104	0.85 m	04/08/2021	9	<0.4	7	9	2	<0.1	6	29	77	<1	<3	3	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
105	0.5 m	04/08/2021	8	<0.4	16	10	14	<0.1	11	40	56	<1	<3	7	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	-	-	-	-	-	-	-	-
106	1 m	04/08/2021	6	<0.4	16	23	12	<0.1	24	79	62	1	<3	9	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	-	-	-	-	-	-	-	-
106	2 m	04/08/2021	6	<0.4	19	19	14	<0.1	47	110	220	2	<3	73	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	-	-	-	-	-	-	-	-
106	4 m	04/08/2021	7	<0.4	20	18	13	<0.1	27	75	220	<1	<3	8	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	-	-	-	-	-	-	-	-
107	1 m	04/08/2021	9	<0.4	17	12	8	<0.1	21	75	56	3	<3	10	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	-	-	-	-	-	-	-	-
107	4 m	04/08/2021	11	<0.4	18	20	19	<0.1	29	85	210	<1	<3	9	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	-	-	-	-	-	-	-	-
108	1 m	04/08/2021	7	<0.4	18	9	20	<0.1	22	52	320	<1	<3	10	<2	<25	<50	690	330	1000	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
109	0.5 m	04/08/2021	<4	<0.4	33	23	3	<0.1	20	40	510	<1	5	11	<2	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	CT1		100	20	100	NC	100	4	40	NC	NC	20	NC	NC	20	650	NC	NC	NC	10000	10	288	600	NC	NC	1000	NC	NC	NC	NC	NC	NC	NC	<50
	SCC1		500	100	1900	NC	1500	50	1050	NC	NC	100	NC	NC	50	650	NC	NC	NC	10000	18	518	1080	NC	NC	1800	NC	NC	NC	NC	NC	NC	NC	<50
	TCLP1		N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	NC	N/A	NC	NC	N/A	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A	NC	NC	NC	NC	NC	NC	NC	N/A
	CT2		400	80	400	NC	400	16	160	NC	NC	80	NC	NC	80	2600	NC	NC	NC	40000	40	1152	2400	NC	NC	4000	NC	NC	NC	NC	NC	NC	NC	<50
	SCC2		2000	400	7600	NC	6000	200	4200	NC	NC	400	NC	NC	200	2600	NC	NC	NC	40000	72	2073	4320	NC	NC	7200	NC	NC	NC	NC	NC	NC	NC	<50
	TCLP2		N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	NC	N/A	NC	NC	N/A	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A	NC	NC	NC	NC	NC	NC	NC	N/A

			PAH																OCP		OPP	Asbestos						
			Benzo(a)pyrene (BAP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Asbestos ID in soil >0.1g/kg	Asbestos ID in soil <0.1g/kg	Trace Analysis	ACM > 7mm Estimation	ACM < 7mm Estimation	FA and AF Estimation	Total Asbestos
	PQL		0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05	0.1	0.1	0.1					<0.01		0.001
Sample ID	Depth	Sample Date	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	-	-	-	g	%(w/w)	g	-
101	1 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
102	1 m	04/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD	NT	NAD	NT	NAD
102	3 m	04/08/2021	**0.71**	<0.1	<0.1	<0.1	**0.6**	**1**	**0.8**	**0.4**	**0.1**	**0.9**	<0.1	**1**	<1	**0.2**	**0.9**	**6.9**	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
103	1.5 m	04/08/2021	**2.3**	<0.1	**0.1**	**0.4**	**2.3**	**3.7**	**2.5**	**1.6**	**0.4**	**4.5**	<0.1	**2.9**	<1	**1.3**	**4.4**	**26**	<0.1	<0.1	<0.1	NAD	-	NAD	-	-	-	NAD
104	0.5 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
D4	0 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
104	0.85 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
105	0.5 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	**0.1**	<0.1	<0.1	**0.1**	<0.1	<0.1	<1	<0.1	**0.1**	**0.4**	-	-	-	-	-	-	-	-	-	-
106	1 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-	-	-	-
106	2 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-	-	-	-
106	4 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-	-	-	-
107	1 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-	-	-	-
107	4 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	-	-	-	-	-	-	-	-	-	-
108	1 m	04/08/2021	**33**	**3.4**	**0.1**	**20**	**40**	**49**	**18**	**29**	**2.8**	**120**	**2.6**	**26**	<1	**51**	**100**	**500**	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
109	0.5 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	NAD	-	NAD	-	-	-	NAD
	CT1		0.8	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200	60	<50	4	NC	NC	NC	NC	NC	NC	NC
	SCC1		10	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200	108	<50	7.5	NC	NC	NC	NC	NC	NC	NC
	TCLP1		N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	NC	NC	NC	NC	NC
	CT2		3.2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800	240	<50	16	NC	NC	NC	NC	NC	NC	NC
	SCC2		23	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800	432	<50	30	NC	NC	NC	NC	NC	NC	NC
	TCLP2		N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	NC	NC	NC	NC	NC

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Total chromium used as initial screen for chromium(VI).

c Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)

d Criteria for scheduled chemicals used as an initial screen

e Criteria for Chlorpyrifos used as initial screen

f All criteria are in the same units as the reported results

PQL Practical quantitation limit

CT1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste

SCC1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

TCLP1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

CT2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste

SCC2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

TCLP2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

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Table B3: Summary of Laboratory Results – Metals, PAH, TRH (Groundwater)

	Analyte	Units	PQL	ANZG (2018) Freshwater 95% toxicant DGVs	NEPM 2013 Table 1A(4) Commercial / Industrial HSL D GW for Vapour Intrusion, Sand			Field_ID	105	106
					2-4m	4-8m	>8m	Sampled Date	17/08/2021	17/08/2021
Metals	Arsenic (Filtered)	mg/L	0.001	0.024					<0.001	<0.001
	Beryllium (Filtered)	mg/L	0.0005						<0.0005	<0.0005
	Boron (Filtered)	mg/L	0.001	0.94					0.2	0.1
	Cadmium (Filtered)	mg/L	0.0001	0.0002					<0.0001	<0.0001
	Chromium (III+VI) (Filtered)	mg/L	0.001	0.0044					0.003	0.001
	Cobalt (Filtered)	mg/L	0.001	0.00014					<0.001	<0.001
	Copper (Filtered)	mg/L	0.001	0.0014					0.002	0.001
	Lead (Filtered)	mg/L	0.001	0.0034					<0.001	<0.001
	Manganese (Filtered)	mg/L	0.005	1.9					<0.005	0.059
	Mercury (Filtered)	mg/L	0.00005	0.0006					<0.00005	<0.00005
	Nickel (Filtered)	mg/L	0.001	0.011					0.001	0.002
	Selenium (Filtered)	mg/L	0.001	0.011					<0.001	0.003
	Zinc (Filtered)	mg/L	0.001	0.008					0.004	0.004
PAHs - Low Level	Total Positive PAHs	mg/L	0.0001						<0.0001	<0.0001
	Acenaphthene	mg/L	0.0001	0.0004					<0.0001	<0.0001
	Acenaphthylene	mg/L	0.0001						<0.0001	<0.0001
	Anthracene	mg/L	0.0001						<0.0001	<0.0001
	Benz(a)anthracene	mg/L	0.0001						<0.0001	<0.0001
	Benzo(a) pyrene	mg/L	0.0001	0.0002					<0.0001	<0.0001
	Benzo(a)pyrene TEQ	mg/L	0.00005						<0.00005	<0.00005
	Benzo(b,j+k)fluoranthene	mg/L	0.00002						<0.00002	<0.00002
	Benzo(g,h,i)perylene	mg/L	0.0001						<0.0001	<0.0001
	Chrysene	mg/L	0.0001						<0.0001	<0.0001
	Dibenz(a,h)anthracene	mg/L	0.0001						<0.0001	<0.0001
	Fluoranthene	mg/L	0.0001	0.0014					<0.0001	<0.0001
	Fluorene	mg/L	0.0001						<0.0001	<0.0001
	Indeno(1,2,3-c,d)pyrene	mg/L	0.0001						<0.0001	<0.0001
	Naphthalene	mg/L	0.0002	0.016					<0.0002	<0.0002
	Phenanthrene	mg/L	0.0001	0.002					<0.0001	<0.0001
	Pyrene	mg/L	0.0001						<0.0001	<0.0001
TRH (C10-C40)	C10-C16	mg/L	0.05						<0.05	<0.05
	C16-C34	mg/L	0.1						<0.1	<0.1
	C34-C40	mg/L	0.1						<0.1	<0.1
	F2-NAPHTHALENE	mg/L	0.05						<0.05	<0.05
	C10 - C14	mg/L	0.05						<0.05	<0.05
	C15 - C28	mg/L	0.1						<0.1	<0.1
	C29-C36	mg/L	0.1						<0.1	<0.1
TRH(C6-C10) and BTEXN	Benzene	mg/L	0.001	0.95	5	5	5		<0.001	<0.001
	Ethylbenzene	mg/L	0.001	0.08					<0.001	<0.001
	Naphthalene	mg/L	0.001	0.016					<0.001	<0.001
	Toluene	mg/L	0.001	0.18					<0.001	<0.001
	C6 - C9	mg/L	0.01						<0.01	<0.01
	Xylene (m & p)	mg/L	0.002						<0.002	<0.002
	Xylene (o)	mg/L	0.001	0.35					<0.001	<0.001
	C6-C10 less BTEX (F1)	mg/L	0.01		6	6	7		<0.01	<0.01
	C6-C10	mg/L	0.01						<0.01	<0.01

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Table B4: Summary of Laboratory Results – Metals, PAH, TRH, OCP, OPP, PCB (Sediment)

			Metals									PAH				TRH						OCP											OPP	PCB							
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Arochlor 1016	Total PCB	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arodor 1260
		PQL	4	0.4	1	1	1	0.1	1	1	1	1	0.05	0.5	0.05	25	50	25	50	100	100	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Depth	Sample Date	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
S1	0 - 0.2 m	09/08/2021	<4	<0.4	7	13	8	<0.1	6	86	56	<1	<0.05	<0.5	<0.05	<25	<25	<25	<50	<50	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
ANZG (2018) Sediment Quality DGVs			20	1.5	80	65	50	0.15	21	200	NC	NC	NC	NC	10	NC	NC	NC	NC	NC	NC	NC	NC	0.0014	0.0012	0.0028	0.0045	NC	NC	NC	NC	NC	NC	NC	0.034	NC	NC	NC	NC	NC

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CERTIFICATE OF ANALYSIS 275588

Client Details

Client	Douglas Partners Newcastle
Attention	Dana Wilson
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**18412.01, Maitland**
Number of Samples	16 Soil
Date samples received	10/08/2021
Date completed instructions received	10/08/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	17/08/2021
Date of Issue	17/08/2021

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu, Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Loren Bardwell, Development Chemist
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	83	96	94	98	102

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		275588-7	275588-8	275588-9	275588-10	275588-11
Your Reference	UNITS	104	105	106	106	106
Depth		0.85	0.5	1	2	4
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	105	91	101	101	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		275588-12	275588-13	275588-14	275588-15	275588-16
Your Reference	UNITS	107	107	108	109	D4
Depth		1	4	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	98	105	102	102	111

svTRH (C10-C40) in Soil						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	114	84	86	90	85

svTRH (C10-C40) in Soil						
Our Reference		275588-7	275588-8	275588-9	275588-10	275588-11
Your Reference	UNITS	104	105	106	106	106
Depth		0.85	0.5	1	2	4
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	84	87	84	85	84

svTRH (C10-C40) in Soil						
Our Reference		275588-12	275588-13	275588-14	275588-15	275588-16
Your Reference	UNITS	107	107	108	109	D4
Depth		1	4	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	14/08/2021	13/08/2021	14/08/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	690	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	330	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	1,000	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	930	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	210	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	1,100	<50	<50
Surrogate o-Terphenyl	%	88	84	93	87	82

svTRH (C10-C40) in Soil		
Our Reference		275588-18
Your Reference	UNITS	S1 - [TRIPLICATE]
Depth		0-0.2
Date Sampled		09/08/2021
Type of sample		Soil
Date extracted	-	17/08/2021
Date analysed	-	17/08/2021
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	84

PAHs in Soil						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.2	1.3	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.9	4.5	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.9	4.4	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.6	2.3	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.4	1.6	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	1	3.7	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.71	2.3	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	1.0	2.9	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.1	0.4	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.8	2.5	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	6.9	26	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	1.1	3.6	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	1.1	3.6	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	1.1	3.6	<0.5
Surrogate p-Terphenyl-d14	%	95	79	79	81	80

PAHs in Soil						
Our Reference		275588-7	275588-8	275588-9	275588-10	275588-11
Your Reference	UNITS	104	105	106	106	106
Depth		0.85	0.5	1	2	4
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	12/08/2021	12/08/2021	13/08/2021	13/08/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.4	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	80	81	88	91	92

PAHs in Soil						
Our Reference		275588-12	275588-13	275588-14	275588-15	275588-16
Your Reference	UNITS	107	107	108	109	D4
Depth		1	4	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	3.4	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	2.6	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	51	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	20	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	120	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	100	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	40	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	29	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	49	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	33	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	26	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	2.8	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	18	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	500	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	48	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	48	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	48	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	90	101	101	91	89

Organochlorine Pesticides in soil						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	81	81	81	83

Organochlorine Pesticides in soil					
Our Reference		275588-7	275588-14	275588-15	275588-16
Your Reference	UNITS	104	108	109	D4
Depth		0.85	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	13/08/2021	13/08/2021	13/08/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	83	85	95	90

Organophosphorus Pesticides in Soil						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	81	81	81	83

Organophosphorus Pesticides in Soil					
Our Reference		275588-7	275588-14	275588-15	275588-16
Your Reference	UNITS	104	108	109	D4
Depth		0.85	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	13/08/2021	13/08/2021	13/08/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	83	85	95	90

PCBs in Soil						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	81	81	81	83

PCBs in Soil					
Our Reference		275588-7	275588-14	275588-15	275588-16
Your Reference	UNITS	104	108	109	D4
Depth		0.85	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	12/08/2021	13/08/2021	13/08/2021	13/08/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	83	85	95	90

Acid Extractable metals in soil						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Arsenic	mg/kg	<4	7	5	9	<4
Beryllium	mg/kg	<1	1	<1	<1	<1
Boron	mg/kg	<3	<3	<3	<3	3
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	17	20	9	29
Cobalt	mg/kg	1	9	9	<1	12
Copper	mg/kg	13	12	15	15	33
Lead	mg/kg	8	10	27	51	3
Manganese	mg/kg	56	74	210	130	490
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	19	15	2	21
Selenium	mg/kg	<2	<2	<2	<2	<2
Zinc	mg/kg	86	55	53	37	39

Acid Extractable metals in soil						
Our Reference		275588-7	275588-8	275588-9	275588-10	275588-11
Your Reference	UNITS	104	105	106	106	106
Depth		0.85	0.5	1	2	4
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Arsenic	mg/kg	9	8	6	6	7
Beryllium	mg/kg	<1	<1	1	2	<1
Boron	mg/kg	<3	<3	<3	<3	<3
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	16	16	19	20
Cobalt	mg/kg	3	7	9	73	8
Copper	mg/kg	9	10	23	19	18
Lead	mg/kg	2	14	12	14	13
Manganese	mg/kg	77	56	62	220	220
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	11	24	47	27
Selenium	mg/kg	<2	<2	<2	<2	<2
Zinc	mg/kg	29	40	79	110	75

Acid Extractable metals in soil						
Our Reference		275588-12	275588-13	275588-14	275588-15	275588-16
Your Reference	UNITS	107	107	108	109	D4
Depth		1	4	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Arsenic	mg/kg	9	11	7	<4	<4
Beryllium	mg/kg	3	<1	<1	<1	<1
Boron	mg/kg	<3	<3	<3	5	<3
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	18	18	33	30
Cobalt	mg/kg	10	9	10	11	12
Copper	mg/kg	12	20	9	23	25
Lead	mg/kg	8	19	20	3	2
Manganese	mg/kg	56	210	320	510	520
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	21	29	22	20	20
Selenium	mg/kg	<2	<2	<2	<2	<2
Zinc	mg/kg	75	85	52	40	36

Acid Extractable metals in soil		
Our Reference		275588-17
Your Reference	UNITS	108 - [TRIPLICATE]
Depth		1
Date Sampled		04/08/2021
Type of sample		Soil
Date prepared	-	12/08/2021
Date analysed	-	13/08/2021
Arsenic	mg/kg	6
Beryllium	mg/kg	<1
Boron	mg/kg	<3
Cadmium	mg/kg	<0.4
Chromium	mg/kg	13
Cobalt	mg/kg	6
Copper	mg/kg	8
Lead	mg/kg	17
Manganese	mg/kg	170
Mercury	mg/kg	<0.1
Nickel	mg/kg	16
Selenium	mg/kg	<2
Zinc	mg/kg	37

Moisture						
Our Reference		275588-1	275588-2	275588-4	275588-5	275588-6
Your Reference	UNITS	S1	101	102	103	104
Depth		0-0.2	1	3	1.5	0.5
Date Sampled		09/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Moisture	%	33	8.1	9.0	14	5.9

Moisture						
Our Reference		275588-7	275588-8	275588-9	275588-10	275588-11
Your Reference	UNITS	104	105	106	106	106
Depth		0.85	0.5	1	2	4
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Moisture	%	4.2	8.4	6.8	8.2	8.0

Moisture						
Our Reference		275588-12	275588-13	275588-14	275588-15	275588-16
Your Reference	UNITS	107	107	108	109	D4
Depth		1	4	1	0.5	-
Date Sampled		04/08/2021	04/08/2021	04/08/2021	04/08/2021	04/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021
Date analysed	-	13/08/2021	13/08/2021	13/08/2021	13/08/2021	13/08/2021
Moisture	%	12	5.6	5.9	7.0	3.0

Asbestos ID - soils			
Our Reference		275588-5	275588-15
Your Reference	UNITS	103	109
Depth		1.5	0.5
Date Sampled		04/08/2021	04/08/2021
Type of sample		Soil	Soil
Date analysed	-	16/08/2021	16/08/2021
Sample mass tested	g	Approx. 40g	Approx. 40g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM - ASB-001		
Our Reference		275588-3
Your Reference	UNITS	102
Depth		1
Date Sampled		04/08/2021
Type of sample		Soil
Date analysed	-	16/08/2021
Sample mass tested	g	361.71
Sample Description	-	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	–
FA and AF Estimation*	g	–
ACM >7mm Estimation*	%(w/w)	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	275588-2
Date extracted	-			12/08/2021	1	12/08/2021	12/08/2021		12/08/2021	12/08/2021
Date analysed	-			13/08/2021	1	13/08/2021	13/08/2021		13/08/2021	13/08/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	85	76
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	85	76
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	79	86
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	77	75
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	101	73
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	85	74
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	99	75
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	114	1	83	72	14	102	91

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	13/08/2021	13/08/2021		[NT]	[NT]
Date analysed	-			[NT]	14	13/08/2021	13/08/2021		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	14	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	14	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	14	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	14	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	14	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	14	102	110	8	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	275588-2
Date extracted	-			12/08/2021	1	12/08/2021	12/08/2021		12/08/2021	12/08/2021
Date analysed	-			13/08/2021	1	13/08/2021	13/08/2021		13/08/2021	13/08/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	92	89
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	93	93
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	270	92	102	109
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	92	89
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	300	100	93	93
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	120	18	102	109
Surrogate o-Terphenyl	%		Org-020	89	1	114	119	4	110	84

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	12/08/2021	12/08/2021		[NT]	[NT]
Date analysed	-			[NT]	14	14/08/2021	14/08/2021		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	14	690	1200	54	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	14	330	450	31	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	14	930	1500	47	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	14	210	250	17	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	14	93	98	5	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	275588-2
Date extracted	-			12/08/2021	1	12/08/2021	12/08/2021		12/08/2021	12/08/2021
Date analysed	-			13/08/2021	1	12/08/2021	12/08/2021		13/08/2021	12/08/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	119	88
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	74
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	82
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	117	99
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	98	83
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	100	88
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	73	65
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	0.09	57	100	92
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	106	1	95	93	2	92	77

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	12/08/2021	12/08/2021		[NT]	[NT]
Date analysed	-			[NT]	14	13/08/2021	13/08/2021		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	14	0.1	0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	14	3.4	6.0	55	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	14	2.6	4.8	59	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	14	51	140	93	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	14	20	34	52	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	14	120	280	80	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	14	100	270	92	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	40	82	69	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	14	29	77	91	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	14	49	95	64	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	14	33	69	71	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	14	26	37	35	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	2.8	4.6	49	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	14	18	27	40	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	14	101	111	9	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	275588-2
Date extracted	-			12/08/2021	1	12/08/2021	12/08/2021		12/08/2021	12/08/2021
Date analysed	-			13/08/2021	1	12/08/2021	12/08/2021		13/08/2021	12/08/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	117	83
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	74
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	68
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	117	94
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	91
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	92
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	117	91
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	70
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	74
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	76
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	1	92	92	0	110	80

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	12/08/2021	12/08/2021		[NT]	[NT]
Date analysed	-			[NT]	14	13/08/2021	13/08/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	85	87	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	275588-2
Date extracted	-			12/08/2021	1	12/08/2021	12/08/2021		12/08/2021	12/08/2021
Date analysed	-			13/08/2021	1	12/08/2021	12/08/2021		13/08/2021	12/08/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	67
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	77
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	69
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	116	84
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	117	95
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	82
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	85
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	1	92	92	0	110	80

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	12/08/2021	12/08/2021		[NT]	[NT]
Date analysed	-			[NT]	14	13/08/2021	13/08/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	85	87	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	275588-2
Date extracted	-			12/08/2021	1	12/08/2021	12/08/2021		12/08/2021	12/08/2021
Date analysed	-			13/08/2021	1	12/08/2021	12/08/2021		13/08/2021	12/08/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	118	94
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	96	1	92	92	0	110	80

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	12/08/2021	12/08/2021		[NT]	[NT]
Date analysed	-			[NT]	14	13/08/2021	13/08/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	14	85	87	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	275588-2
Date prepared	-			12/08/2021	1	12/08/2021	12/08/2021		12/08/2021	12/08/2021
Date analysed	-			13/08/2021	1	13/08/2021	13/08/2021		13/08/2021	13/08/2021
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	97	81
Beryllium	mg/kg	1	Metals-020	<1	1	<1	<1	0	88	75
Boron	mg/kg	3	Metals-020	<3	1	<3	<3	0	73	#
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	96	81
Chromium	mg/kg	1	Metals-020	<1	1	7	7	0	97	80
Cobalt	mg/kg	1	Metals-020	<1	1	1	1	0	93	81
Copper	mg/kg	1	Metals-020	<1	1	13	13	0	94	88
Lead	mg/kg	1	Metals-020	<1	1	8	8	0	94	77
Manganese	mg/kg	1	Metals-020	<1	1	56	57	2	95	84
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	111	111
Nickel	mg/kg	1	Metals-020	<1	1	6	6	0	93	87
Selenium	mg/kg	2	Metals-020	<2	1	<2	<2	0	90	72
Zinc	mg/kg	1	Metals-020	<1	1	86	86	0	97	105

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	14	12/08/2021	12/08/2021		[NT]	[NT]
Date analysed	-			[NT]	14	13/08/2021	13/08/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	14	7	13	60	[NT]	[NT]
Beryllium	mg/kg	1	Metals-020	[NT]	14	<1	<1	0	[NT]	[NT]
Boron	mg/kg	3	Metals-020	[NT]	14	<3	<3	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	14	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	14	18	11	48	[NT]	[NT]
Cobalt	mg/kg	1	Metals-020	[NT]	14	10	5	67	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	14	9	7	25	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	14	20	12	50	[NT]	[NT]
Manganese	mg/kg	1	Metals-020	[NT]	14	320	210	42	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	14	22	14	44	[NT]	[NT]
Selenium	mg/kg	2	Metals-020	[NT]	14	<2	<2	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	14	52	37	34	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, sample 275588-3 is below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Asbestos: A portion of the supplied samples were sub-sampled for asbestos
analysis according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 275588-5 & 15 were sub-sampled from jars provided by the client.

Acid Extractable Metals in Soil:
- The laboratory RPD acceptance criteria has been exceeded for 275588-14 for Cr, Co, Pb, Mn and Ni. Therefore a triplicate result has been issued as laboratory sample number 275588-17.
- # Low spike recovery was obtained for this sample. Sample matrix interference is suspected. However, an acceptable recovery was obtained for the LCS.

TRH Soil C10-C40 NEPM - The laboratory RPD acceptance criteria has been exceeded for 275588-1. Therefore a triplicate result has been issued as laboratory sample number 275588-1.

PAHs in Soil - The RPD for duplicate results is accepted due to the non homogenous nature of sample/s 275588-14,14d.

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CERTIFICATE OF ANALYSIS 276099

Client Details

Client	Douglas Partners Newcastle
Attention	Dana Wilson
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**18412.01**
Number of Samples	2 Water
Date samples received	18/08/2021
Date completed instructions received	18/08/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	23/08/2021
Date of Issue	24/08/2021
Reissue Details	This report replaces R01 due to an amendment to the sample ID (ELS 1 & 2).

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water			
Our Reference	UNITS	276099-1	276099-2
Your Reference		105	106
Date Sampled		17/08/2021	17/08/2021
Type of sample		Water	Water
Date extracted	-	18/08/2021	18/08/2021
Date analysed	-	18/08/2021	18/08/2021
TRH C_6 - C_9	µg/L	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	102	101
Surrogate toluene-d8	%	100	100
Surrogate 4-BFB	%	90	90

svTRH (C10-C40) in Water			
Our Reference	UNITS	276099-1	276099-2
Your Reference		105	106
Date Sampled		17/08/2021	17/08/2021
Type of sample		Water	Water
Date extracted	-	19/08/2021	19/08/2021
Date analysed	-	19/08/2021	19/08/2021
TRH C_{10} - C_{14}	µg/L	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50
Surrogate o-Terphenyl	%	88	82

PAHs in Water - Low Level			
Our Reference		276099-1	276099-2
Your Reference	UNITS	105	106
Date Sampled		17/08/2021	17/08/2021
Type of sample		Water	Water
Date extracted	-	19/08/2021	19/08/2021
Date analysed	-	19/08/2021	19/08/2021
Naphthalene	µg/L	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	81	76

HM in water - dissolved			
Our Reference		276099-1	276099-2
Your Reference	UNITS	105	106
Date Sampled		17/08/2021	17/08/2021
Type of sample		Water	Water
Date prepared	-	19/08/2021	19/08/2021
Date analysed	-	19/08/2021	19/08/2021
Arsenic-Dissolved	µg/L	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	3	1
Copper-Dissolved	µg/L	2	1
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	1	2
Zinc-Dissolved	µg/L	4	4
Beryllium-Dissolved	µg/L	<0.5	<0.5
Boron-Dissolved	µg/L	200	100
Cobalt-Dissolved	µg/L	<1	<1
Manganese-Dissolved	µg/L	<5	59
Selenium-Dissolved	µg/L	<1	3

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			18/08/2021	[NT]	[NT]	[NT]	[NT]	18/08/2021	[NT]
Date analysed	-			18/08/2021	[NT]	[NT]	[NT]	[NT]	18/08/2021	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	93	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	93	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-BFB	%		Org-023	90	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			19/08/2021	[NT]	[NT]	[NT]	[NT]	19/08/2021	[NT]
Date analysed	-			19/08/2021	[NT]	[NT]	[NT]	[NT]	19/08/2021	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	111	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	84	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	111	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	84	[NT]
Surrogate o-Terphenyl	%		Org-020	77	[NT]	[NT]	[NT]	[NT]	75	[NT]

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			19/08/2021	[NT]	[NT]	[NT]	[NT]	19/08/2021	[NT]
Date analysed	-			19/08/2021	[NT]	[NT]	[NT]	[NT]	19/08/2021	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	91	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	66	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	92	[NT]	[NT]	[NT]	[NT]	78	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			19/08/2021	[NT]	[NT]	[NT]	[NT]	19/08/2021	[NT]
Date analysed	-			19/08/2021	[NT]	[NT]	[NT]	[NT]	19/08/2021	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	100	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	95	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	87	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Appendix C

Site Assessment Criteria
Quality Assurance and Quality Control Report
Data Quality Objectives
Field Work Methodology
Chain of Custody (Field and Despatch)
Laboratory Sample Receipt

Appendix C
Site Assessment Criteria
Lots 19-23 DP746311, Bungaree Street, Maitland

C1.0 Introduction

C1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).
- CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.
- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).
- NHMRC *Guidelines for Managing Risks In Recreational Water* (NHMRC, 2008).
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011, Version 3.2* (NHMRC, NRMMC, 2016).
- WQA *Toxicant default guideline values for sediment quality* (WQA, 2019).

C1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC.

- Land Use: Commercial / Industrial
  - Corresponding to land use category 'D', commercial / industrial such as shops, offices, factories and industrial sites.
- Soil type: sand.

C2.0 Soils

C2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-D
Metals	
Arsenic	3000
Beryllium	500
Boron	300 000
Cadmium	900
Chromium (VI)	3600
Cobalt	4000
Copper	240 000
Lead	1500
Manganese	60 000
Mercury (inorganic)	730
Nickel	6000
Selenium	10 000
Zinc	400 000
PAH	
B(a)P TEQ	40
Total PAH	4000
OCP	
DDT+DDE+DDD	3600
Aldrin and dieldrin	45
Chlordane	530
Endosulfan	2000
Endrin	100
Heptachlor	50
HCB	80
Methoxychlor	2500
OPP	
Chlorpyrifos	2000
PCB	
PCB	7

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-D	HSL-D	HSL-D	HSL-D
SAND	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	3	3	3	3
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	230	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TRH F1	260	370	630	NL
TRH F2	NL	NL	NL	NL

Notes to Table 2:

TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-D
Benzene	430
Toluene	99 000
Ethylbenzene	27 000
Xylenes	81 000
Naphthalene	11 000
TRH F1	26 000
TRH F2	20 000
TRH F3	27 000
TRH F4	38 000

Notes to Table 3:

TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

C2.2 Asbestos in Soil

The HSL for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The HSL are in Table 4.

Table 4: Health Screening Levels for Asbestos

Form of Asbestos	HSL-A	HSL-B	HSL-C	HSL-D
ACM	0.01%	0.04%	0.02%	0.05%
FA and AF	0.001%	0.001%	0.001%	0.001%
FA and AF and ACM	No visible asbestos for surface soil *	No visible asbestos for surface soil *	No visible asbestos for surface soil *	No visible asbestos for surface soil *

Notes to Table 4:

Surface soils defined as top 10 cm.

* Based on site observations at the sampling points and the analytical results of surface samples.

C2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 6, with inputs into their derivation shown in Table 5.

Table 5: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	“Aged” (>2 years)	Assumption
pH	6	Conservative assumption
CEC	5 $cmol_c/kg$	Conservative assumption
Clay content	5 %	Conservative assumption
Traffic volumes	High	Site is occupied
State / Territory	New South Wales	-

Table 6: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-D
Metals	
Arsenic	160
Copper	160
Nickel	60
Chromium III	540
Lead	1800
Zinc	480
PAH	
Naphthalene	370
OCP	
DDT	640

C2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 7.

Table 7: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	EIL-D
Benzene	Coarse	75
Toluene	Coarse	135
Ethylbenzene	Coarse	165
Xylenes	Coarse	180
TRH F1	Coarse/ Fine	215*
TRH F2	Coarse/ Fine	170*
TRH F3	Coarse	1700
TRH F4	Coarse	3300
B(a)P	Coarse	(1.4) 33 (1)

Notes to Table 7:

ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability

TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} including naphthalene

(1) CRC CARE (2017)

The NEPM (2013) ESL of 0.7 mg/kg for benzo(a)pyrene (B(a)P) is understood to be based on a single invertebrate species referenced in the Canadian Soil Quality Guidelines (1999, since updated) and is considered conservative in the Australian context. These guidelines were updated in 2010 and now suggest a B(a)P concentration of 20 mg/kg for the protection of environmental health based on the soil contact exposure pathway.

It is also noted that the B(a)P ESL is a low reliability value. Higher reliability screening levels have been published in CRC CARE (2017), Risk-based Management and Remediation Guidance for Benzo(a)pyrene, CRC CARE Technical Report No. 39. The high reliability value of 33 mg/kg for aged contamination recommended in CRC CARE (2017) has therefore been adopted.

C2.5 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards;
- Effects on buried infrastructure eg: penetration of, or damage to, in-ground services.

The adopted management limits are in Table 8.

Table 8: Management Limits (mg/kg)

Contaminant	Soil Type	ML-D
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	3500
TRH F4	Coarse	10 000

Notes to Table 8:
TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

C2.6 Sediment

The recommended toxicant default guideline value for sediment quality is derived from ANZECC (2000) and the Water Quality Australia webpage for *Toxicant default guideline values for sediment quality*. Adopted guidelines are in Table 9.

Table 9: Sediment quality toxicant limits (mg/kg)

Contaminant	DGV
Metals	
Antimony	2.0
Cadmium	1.5
Chromium	80
Copper	65
Lead	50
Mercury	0.15
Nickel	21
Zinc	200
Organics	
Total PAH	10
Total DDT	0.0012
DDE	0.0014
DDD	0.0035
Chlordane	0.0045
Dieldrin	0.0028
Endrin	0.0027
Lindane	0.0009
Total PCB	0.034
Other	
Arsenic	20

Notes to Table 9:
Where the contaminant does not have a % LOP, the 'unknown' LOP has been adopted
NC – No criteria
DGV – Default Guideline Value

C3.0 Groundwater

C3.1 Introduction

The groundwater investigation levels (GIL) used for interpretation of the groundwater data (as a Tier 1 assessment) have been selected based on the potential risks posed from contamination sourced from the site to receptors at or down-gradient of the site, as identified by the conceptual site model (CSM). The receptors, exposure points and pathways are summarised in Table 10.

Table 10: Summary of Potential Receptors and Potential Risks

Receptor	Location	Exposure Point	Exposure Pathway
Surface water aquatic ecosystem	Down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Exposure to contaminants.
Occupants of buildings	On site	Enclosed buildings	Inhalation of VOC (including TRH and BTEX) overlying VOC impacted groundwater via the vapour intrusion pathway.

The rationale for the selection of GIL is in Table 11.

Table 11: Groundwater Investigation Level Rationale

Receptor / Beneficial Use	GIL	Source	Comments / Rationale
Aquatic ecosystem	DGV	ANZG (2018)	Freshwater 95% LOP for bioaccumulative contaminants 95% LOP for non-bioaccumulative contaminants Marine water 95% LOP for bioaccumulative contaminants 95% LOP for non-bioaccumulative contaminants
Aquatic ecosystem	DGV	HEPA (2020)	Freshwater 95% LOP Marine water 95% LOP
Building occupants (vapour intrusion)	HSL	NEPC (2013)	2 m to <4 m / 4 m to <8 m / 8 m+

Notes to 11:
DGV default guideline value
% LOP percentage level of protection of species
HSL health screening level

C3.2 Groundwater Investigation Levels for Aquatic Ecosystems

The DGV for the protection of aquatic ecosystems derived from ANZG (2018) are in Table 12.

Table 12: Groundwater Investigation Levels for Protection of Aquatic Ecosystems (mg/L)

Contaminant	Fresh Water 95% toxicant DGVs
Metals	
Arsenic	0.024
Boron	0.94
Cadmium	0.0002
Chromium (VI)	0.0044
Cobalt	0.00014
Copper	0.0014
Lead	0.0034
Manganese	1.9
Mercury (inorganic)	0.0006
Nickel	0.011
Selenium	0.011
Zinc	0.008
PAH	
Acenaphthene	0.0004
Benzo(a)pyrene	0.0002
Fluoranthene	0.0014
Naphthalene	0.016
Phenanthrene	0.002
BTEX	
Benzene	0.95
Ethylbenzene	0.08
Naphthalene	0.016
Toluene	0.18
Xylene (o)	0.35

Notes to Table 12:
Where the contaminant does not have a % LOP, the 'unknown' LOP has been adopted
NC – No criteria
DGV – Default Guideline Value

C3.3 Health Screening Levels for Vapour Intrusion

The HSL to evaluate potential vapour intrusion risks derived from NEPC (2013) are in Table 13.

Table 13: Groundwater Health Screening Levels for Vapour Intrusion (µg/L)

Contaminant	HSL-D	HSL-D	HSL-D	Solubility Limit
SAND	**2 m to <4 m**	**4 m to <8 m**	**8 m+**	**-**
Benzene	5000	5000	5000	59 000
Toluene	NL	NL	NL	61 000
Ethylbenzene	NL	NL	NL	3900
Xylenes	NL	NL	NL	21 000
Naphthalene	NL	NL	NL	170
TRH F1	6000	6000	7000	9000
TRH F2	NL	NL	NL	3000

Notes To Table 13:

TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

C4.0 References

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australia and New Zealand Environment and Conservation Council.

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene. Technical Report no. 39.* Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NHMRC. (2008). *Guidelines for Managing Risks In Recreational Water.*

NHMRC, NRMMC. (2016). *Australian Drinking Water Guidelines 6 2011, Version 3.2.* Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

WQA. (2019). *Toxicant default guideline values for sediment quality.* Water Quality Australia.

Appendix C
Quality Assurance and Quality Control Report
Lots 19-23 DP746311, Bungaree Street, Maitland

C1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other filed QC samples are included in the summary results at the end of this appendix.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	5% - 10% of primary samples; <30% RPD	PC
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes to Table 1:
C = compliance; PC = partial compliance; NC = non-compliance

The RPD results were all within the acceptable range, with the exception of those indicated in Table QA1. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- Most of the recorded concentrations being relatively close to the PQL;
- The replicate pairs being collected from fill soils which by its nature is heterogeneous;

- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence, greater variability can be expected;
- All other QA/QC parameters met the DQIs.

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the preliminary assessment.

C2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;
- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;
- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Preparation of field groundwater sampling sheets.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced sampler(s) used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

C3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

C4.0 Reference

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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Table QA1: Relative Percentage Difference Results – Intra-laboratory Replicates

			Metals														TRH					PCB							
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	Beryllium	Boron	Cobalt	Selenium (Total)	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCB
Sample ID	Depth	Sample Date	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
D4	-	04/08/2021	<4	<0.4	30	25	2	<0.1	20	36	520	<1	<3	12	<2	<25	<50	<100	<100	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
D4	0.5 m	04/08/2021	<4	<0.4	29	33	3	<0.1	21	39	490	<1	3	12	<2	<25	<50	<100	<100	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		Difference	0	0	1	8	1	0	1	3	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	3%	28%	40%	0%	5%	8%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

			PAH															OCP		OPP	BTEX						
			Benzo(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)
Sample ID	Depth	Sample Date	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
D4	-	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.2	<0.5	<1	<2	<1	<3
D4	0.5 m	04/08/2021	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.2	<0.5	<1	<2	<1	<3
		Difference	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
		RPD	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%

Appendix C
Data Quality Objectives
Lots 19-23 DP746311, Bungaree Street, Maitland

C1.0 Data Quality Objectives

The DSI has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The objective of the investigation is to confirm the contamination status of the site for due diligence purposes with respect to the current and proposed continuation of the site for commercial/industrial land use. A preliminary conceptual site model (CSM) has been prepared (Section 7) for the site. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager, Field staff. The preliminary subsurface investigation focussed on the highest risks of potential contamination based on the site history and current site condition.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the CSM (Section 7). The CSM identifies the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Appendix C. The decision is to establish whether or not the results fall below the SAC or whether or not the 95% upper confidence limit of the sample population falls below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective and whether (or not) further assessment and / or remediation will be derived.
3: Identify the information inputs	Inputs to the investigation will be the results of analysis of samples to measure the concentration of COPC identified in the CSM (Section 7) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the COPC are detailed in Appendix C. A photoionization detector (PID) will be used on-site to screen soils for VOC. PID readings will be used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The lateral boundaries of the investigation area are shown on Drawing 1, Appendix E. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment is limited to the timeframe over which the field investigation was undertaken. Constraints to the assessment are identified and discussed in the conclusions of the report, Section 13.

Step	Summary
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC (Appendix C) based on NEPC (2013). Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) shall be adopted where possible. Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s). Initial comparisons will be with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in the Quality Assurance and Quality Control Report in Appendix C.
6: Specify the performance or acceptance criteria	Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) complies with human health and environmental SAC and as such, does not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true. Uncertainty that may exist due to the above potential decision errors shall be mitigated as follows: As well as a primary screening exercise, the use of the 95% UCL as per NEPC (2013) may be applied, ie: 95% is the defined confidence level associated with the UCL on the geometric mean for contaminant data. The resultant 95%UCL shall subsequently be screened against the corresponding SAC. The statistical assessment will only be able to be applied to certain datasets, such as those obtained via systematic sampling. Identification of areas for targeted sampling will be via professional judgement and errors will not be able to have a probability assigned to them.
7: Optimise the design for obtaining data	As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program is reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the proposed sampling plan are presented in Section 8.

C2.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.