Contamination and Preliminary Waste Classification Assessment

Max McMahon Oval, Rutherford NSW

NEW22P-0130-AA
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Executive Summary

Qualtest Laboratory NSW Pty Ltd (Qualtest) carried out a Contamination and Preliminary Waste Classification Assessment for EJE Architecture Pty Ltd (EJE) on behalf of Maitland City Council for a site located at Max McMahon Oval, off Weblands Street, Rutherford, NSW (the site).

It is proposed to construct a new amenities building at Max McMahon Oval. The new amenities building will be located within an approximately 2,400m^2 development area, located in the central west of Lot 3, DP 232261.

A contamination assessment was required to support a Development Application to Maitland City Council for the proposed amenities building. In addition, a preliminary waste classification of the in-situ soils was requested to assist with planning.

The objectives of the assessment were to:

- Provide an assessment of whether the in-situ material on the site was suitable for re-use on the site from a contamination perspective (onsite open space land use);
- Provide a preliminary waste classification assessment of the material; and
- Provide recommendations on the need for further assessment, management and/or remediation (if required).

In order to achieve the above objectives, Qualtest carried out the following scope:

- Site walkover;
- Limited desktop study to assess past uses of the site;
- Drilling of nine boreholes (BH01 to BH09) and collection of soil samples;
- Laboratory analysis of selected soil samples; and
- Data assessment and preparation of this Contamination and Preliminary Waste Classification Report.

Based on the results of the work completed as part of this assessment, the in-situ material is considered suitable for onsite reuse in accordance with ASC NEPM 2013 guidelines for public open space land uses.

Based on the preliminary waste classification assessment, the surface soils and fill materials across the site classify as General Solid Waste (non-putrescible). The underlying residual soils and weathered rock would likely classify as Virgin Excavated Natural Material (VENM), as long as they are not mixed with any topsoil, fill, or waste materials.

If conditions other than those encountered during this assessment are uncovered, further assessment by an environmental consultant may be necessary.

This report was prepared in general accordance with the relevant sections of the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land, the *National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013*, Canberra (referred to as ASC NEPM 2013), and NSW EPA (2014) Waste Classification Guidelines.

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1.0 Introduction

Qualtest Laboratory NSW Pty Ltd (Qualtest) carried out a Contamination and Preliminary Waste Classification Assessment for EJE Architecture Pty Ltd (EJE) on behalf of Maitland City Council for a site located at Max McMahon Oval, off Weblands Street, Rutherford, NSW (the site). The site location is shown on Figure 1, Appendix A.

It is proposed to construct a new amenities building at Max McMahon Oval. The new amenities building will be located within an approximately 2,400m^2 development area, located in the central west of Lot 3, DP 232261.

A contamination assessment was required to support a Development Application to Maitland City Council for the proposed amenities building. In addition, a preliminary waste classification of the in-situ soils was requested to assist with planning.

This report was prepared in general accordance with the relevant sections of the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land, the *National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013*, Canberra (referred to as ASC NEPM 2013), and NSW EPA (2014) Waste Classification Guidelines.

1.1 Objectives

The objectives of the assessment were to:

- Provide an assessment of whether the in-situ material on the site was suitable for re-use on the site from a contamination perspective (onsite open space land use);
- Provide a preliminary waste classification assessment of the material; and
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1.2 Scope of Works

In order to achieve the above objectives, Qualtest carried out the following scope:

- Site walkover;
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- Drilling of nine boreholes (BH01 to BH09) and collection of soil samples;
- Laboratory analysis of selected soil samples; and
- Data assessment and preparation of this Contamination and Preliminary Waste Classification Report.

2.0 Site Description

2.1 Site Identification

General site information is provided below in Table 2.1. The site location is shown in Figure 1, Appendix A.

Table 2.1: Summary of Site Details

Site Address:	Max McMahon Oval Off Weblands Street, Rutherford NSW
Approximate site area and dimensions:	Approx. 2,400m^2 Approx. 25m wide by 115m long at its widest and longest points.
Title Identification Details:	Part of Lot 3, DP 232261 within the Maitland City Council local government area.
Current Zoning	RE1 Public Recreation
Current Ownership:	Maitland City Council
Current Occupier:	Max McMahon Oval Sport Complex
Previous and Current Landuse:	Max McMahon Oval Sport Complex - Recreational/ open space
Proposed Landuse:	Max McMahon Oval Sport Complex - Recreational/ open space
Adjoining Site Uses (Adjoining Sports Complex):	Rutherford High School and Rutherford Public School to the north, and residential to the south, east and west.
Site Coordinates for approx. centre of site:	32°42'46.92 S 151°31'46.91 E

2.2 Topography and Drainage

Reference to the NSW Land and Property Information Spatial Information Exchange website (https://six.nsw.gov.au/wps/portal/) indicated the elevation of the site was approximately between 40m and 45m AHD.

The site was observed to slope from the west to east. Rain falling on the site would be expected to infiltrate into the site surface. Excess surface water was expected to follow the site topography, and eventually drain into a municipal stormwater drain, located along Avery Street, located to the east of the site.

2.3 Geology and Soils

Reference to the 1:100,000 Newcastle-Hunter Quaternary Geology Sheet (2007) indicates the site is underlain by the Maitland Group comprising quartz-lithic sandstone (sporadic marine fossils), polymictic pebble to cobble-paraconglomerate, siltstone, fossiliferous siltstone, minor claystone and chert.

2.4 Hydrogeology

Groundwater beneath the site was anticipated to be present in a semi-confined aquifer in residual soils and/or weathered rock. Groundwater was expected to be present on the site at depths greater than 5m below ground surface (bgs). Groundwater flow direction was anticipated to flow towards an unnamed creek located approximately 370m east of the site.

It should be noted that groundwater conditions can vary due to rainfall and other influences including regional groundwater flow, temperature, permeability, recharge areas, surface condition, and subsoil drainage.

A search of the NSW Department of Primary Industries (Office of Water) registered groundwater bores located within a 500m radius of the site was undertaken. The search revealed that there were four bores within this radius. A summary of the information available for the bores is provided in Table 2.4 below. A copy of the search is provided in Appendix C.

Table 2.4 – Summary of Registered Groundwater Bore Information

Bore ID	Installation Date	Purpose	Approx. Distance and Gradient from Site	Water Bearing Zones (mbgs)
GW202692	16/08/2011	Monitoring Bore	430m W, up-gradient	6.0 – 9.0*
GW202693	16/08/2011	Monitoring Bore	430m W, up-gradient	4.5 to 7.5*
GW202694	16/08/2011	Monitoring Bore	430m W, up-gradient	4.45 – 7.45*
GW203443	01/06/2015	Stock, irrigation	175m N, cross gradient	60.00 – 61.00

Note: *water bearing zone based on depth range of slotted PVC in monitoring well. NK – not known; N – North, E – East, S – South, W – West

2.5 Acid Sulfate Soils

Reference to the Acid Sulfate Soil online database from State of NSW and Department of Planning, Industry and Environment, 2021(https://espade.environment.nsw.gov.au) the site is located in an area of 'no known occurrence' of acid sulfate soils.

3.0 Previous Reports

Qualtest has not been provided with or been made aware of any previous assessment conducted on the site.

4.0 Site Observations

A Qualtest Environmental Scientist carried out a site walkover to assess site features. A summary of the site features is outlined below:

- The site was observed to slope from the western portion to the eastern portion of the site.
- A grandstand and amenities block were observed in the central portion of the site and comprised of concrete block walls, concrete floor slab and stairs, and steel/wooden roofing and seating;
- The remainder of the site was mostly well-maintained grass or concrete pavement; and
- Steel fencing was observed on the western side of the grandstand and amenities block.

Photographs taken during field works are shown below.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Photograph 1 – Southern portion of the site, facing north.</td><td>Photograph 2 – Central portion of site, facing north.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Photograph 3: Central portion of site, facing south.</td><td>Photograph 4: Central portion of site, facing north.</td></tr>
</table>

5.0 Aerial Photograph Review

Aerial photographs of the site from 1944, 1954, 1974, 1984 and 1993 obtained from the NSW Government Spatial Portal (https://portal.spatial.nsw.gov.au/), and satellite images from Google Earth for 2001, 2010 and 2022 were assessed by a Qualtest Environmental Scientist. The results of the aerial photograph review are summarised below in Table 5.1. The aerial photographs are presented in Appendix C.

Table 5.1: Aerial Photograph Review

Year	Site	Surrounding Land
1944	The site appears to be mostly undeveloped cleared land.	The surrounding land appears to be mostly cleared land, with some scattered trees. Mostly rural residential land in each direction.
1954	The site is similar to the previous photograph.	The surrounding area appears similar to the previous aerial photograph.
1974	A structure has been developed in the central portion of the site, which looks similar to the amenities building present today.	A sports oval has been developed to the immediate east. Residential housing and road infrastructure has been developed to the south, east, west, north and north west. Surrounding roads appear to have been paved.
1984	The site is similar to the previous photograph.	A residential housing development is under construction to the north. Housing density has increased to the north-east.
1993	Two new structures have been constructed. One is observed in the northern portion and the second appears to be immediately south of the original structure in the central portion.	The development to the north appears to be completed. The remaining surrounding area appears similar to the previous aerial photograph.
2001	The site is similar to the previous photograph.	The surrounding area appears similar to the previous aerial photograph.
2010	The site is similar to the previous photograph.	The surrounding area appears similar to the previous aerial photograph.
2022	The structure located in the northern portion has had a change of roof colour, possibly rust affected.	A large building, possibly a school has been developed to the north-west. The remaining surrounding area appears similar to the previous aerial photograph.

6.0 Data Quality Objectives

6.1 Step 1 – State the Problem

Potential for contaminated soil to be present on the site, that is not suitable for onsite reuse. The waste classification for material that may require disposal offsite is not known.

6.2 Step 2 – Identify the Decisions

The decisions to be made are:

- Is the site contaminated with respect to the proposed landuse criteria and are there exposure pathways to receptors;
- Will the site require remediation, and if so, what level and type of remediation will be required to make the site suitable for the proposed land use, from a contamination perspective?
- What is the preliminary waste classification for the soil?

6.3 Step 3 – Identify the Inputs to the Decisions

Inputs into the decision are:

- Have samples been collected in the required areas of the site?
- Have samples been collected at the required frequencies and adequately represent the conditions on site?
- Is the data set adequate to perform statistical analysis, if required (i.e. calculate 95% UCL)
- Have the samples been analysed for the COPCs identified?
- Have concentrations exceeding the adopted criteria been reported in the samples?
- If concentrations exceeding adopted criteria have been reported, will these areas require remediation and/or management?

The informational inputs into the decision are:

- Field observations and field screening results;
- Laboratory results (concentrations of contaminants in soil);
- QA/QC documentation and data;
- Adopted assessment criteria (see Section 8); and,
- Relevant NSW EPA endorsed Guidelines.

Media to be sampled and analysed is:

- Soil.

Based on the requirements of the current assessment, groundwater, surface water and/or soil gases are not required to be assessed.

6.4 Step 4 – Define the Study Boundaries

The study boundary is defined laterally as the site boundary, located in part of Lot 3, DP 232261 within the Maitland City Council government area. The site is located off Weblands Street, Rutherford, NSW and covers an area of approximately 2,400m^2 (refer to Figure 1, Appendix A). Vertically, the study boundary will be defined by the depth of anticipated excavation depth. It is anticipated the vertical boundary would be a maximum of 2.0m bgs.

Temporally the study boundaries are the day of sampling, 14 July 2022.

6.5 Step 5 – Develop a Decision Rule

Chemicals of Potential Concern (COPCs) identified for the site are based on common contaminants and include:

- Heavy Metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc, mercury);
- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH); and
- Asbestos.

The decision rules can be defined as: -

- If the laboratory quality assurance/ quality control data are within the acceptable ranges, the data will be considered suitable for use;
- If the COPCs are reported above the adopted criteria and/or at elevated levels (where no criteria are available) then it will be considered whether further assessment, remediation and/or management measures are required;
- Where concentrations are below the assessment criteria, then no further assessment, remediation and/or management of that contaminant, in that area, in that media, is required; and,
- The preliminary waste classification will be based on concentrations of COPC compared to waste classification criteria.

6.6 Step 6 – Specify Acceptable Limits on Decision Errors

There are two types of errors:

- Type 1 – finding that the site is contaminated, when it is not;
- Type 2 – finding that the site is uncontaminated, when it is.

To reduce the potential for errors, the following will be applied:

- Appropriate field sampling methodologies and collection of field data;
- Robust QA/QC assessment of field procedures and laboratory data;
- Appropriate sampling and analytical density;
- Use of statistics (i.e. 95% UCL) to assess arithmetic average of COPCs. Use of statistics will also take into account:
    - No sample should report a concentration more than 250% of the adopted criteria; and,
    - The standard deviation of a sample population should not exceed 50% of the adopted criteria.

6.7 Step 7 – Optimise the Design for Obtaining Data

The methodologies presented in this report are designed to meet the nominated DQOs. Optimisation of the data collection process will be achieved by:

- Working closely with the analytical laboratories and sampling equipment suppliers so that:
  - appropriate laboratory procedures and processes are developed and implemented prior to and during the field work; and
  - that sampling, handling, and transport to, and processing by, the analytical laboratories is appropriate.
- Conduct sampling in accordance with industry best practice and Standard Operating Procedures (SOPs) for the type of sampling being conducted.

7.0 Field and Laboratory Investigations

7.1 Sampling Plan

The NSW EPA (1995) Sampling Design Guidelines recommends a minimum of nine sampling locations to characterise an area of 2,400m^2, this sampling density has been adopted. The boreholes were spread across the site, excluding the areas of existing buildings.

The location of the boreholes are shown on Figure 2, Appendix A. The borehole logs are presented in Appendix D.

7.2 Soil Sampling

Nine boreholes (BH01 to BH09) locations were drilled on the site. The boreholes were drilled using a 2.7 mini-excavator equipped with a 300mm diameter auger attachment. Soil samples were at about 0.5m intervals.

Soil samples were collected directly from the auger. A clean pair of disposable gloves was used whilst handling each new sample.

At the surface (0.0-0.1m) of each borehole asbestos samples were collected using the gravimetric method, comprising collection of a 10L sample, screening through a 6.7mm sieve, and weighing of potential ACM fragments (where present).

The soil samples were placed into 250mL laboratory supplied glass jars and the samples for asbestos testing were placed in dedicated asbestos sampling plastic zip-lock bags for laboratory analysis. Each sample was placed directly into an ice-chilled esky and remained chilled during transportation to the laboratory.

7.3 Laboratory Analysis

The samples were dispatched to the NATA-accredited Eurofins laboratory under chain of custody conditions. The soil samples were analysed for the following:

- Total Recoverable Hydrocarbons (TRH) – 9 primary soil samples;
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) – 9 primary soil samples;
- Polycyclic Aromatic Hydrocarbons (PAHs) – 9 primary soil samples;
- Metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury) – 9 primary soil samples;

- TCLP benzo(a)pyrene – 1 primary soil sample; and,
- Asbestos (Quantitative %w/w) – 9 primary soil samples.

For quality control samples, see Section 9.

8.0 Assessment Criteria

8.1 Exposure Scenario

The site is proposed to be redeveloped for a new amenities building. This type of development is considered to represent recreational/open space land use.

8.2 Health and Ecological Levels (Soil)

To assess whether the material is suitable for re-use on-site, the laboratory results were compared to the health and ecological investigation levels for soil, presented in the *National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013*, Canberra (referred to as ASC NEPM 2013).

ASC NEPM (2013) provides health and ecological investigation and screening levels for different exposure scenarios based on a proposed land use. They are adopted as concentrations of a contaminant above which either further appropriate investigation and/or evaluation will be required, or development of an appropriate management strategy (including remediation).

Health Investigation Levels (HILs) and Health Screening levels (HSLs) are applicable for assessing human health risk via relevant exposure pathways. The HILs were developed for a broad range of metals and organic substances. These are generic to all soil types. The HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via inhalation and direct contact with soil and groundwater. The HSLs depend on specific soil physicochemical properties, building configurations, land use scenarios and the depth that groundwater is encountered.

Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) are applicable for assessing risk to terrestrial ecosystems under residential, open space and commercial/industrial land use scenarios. They apply to the top 2m of soil, which corresponds to the root zone and habitation zone of many species. The EILs are associated with selected metals and organic compounds. The EILs are site specific and are determined by calculating an Ambient Background Concentration (ABC) and an Added Contaminant Limit (ACL) for the site, which are added together to get the EIL. The EIL's for the site have been calculated using an ABC and site specific pH, Cation Exchange Capacity (CEC) and clay content values. The ABC obtained from Trace element concentrations in soils from rural and urban areas of Australia.

It is noted the ESLs for benzo(a)pyrene (ASC NEPM, 2013) were adopted from Canadian Soil Quality Guidelines (SQGs) presented in Environment Canada (2004), and were noted to have a low-reliability. The ESLs for benzo(a)pyrene in ASC NEPM (2013) were based on a review of Canadian SQGs by Dr Michael Warne, who completed the review in February 2010. Since the completion of Warne (2010) (which are included in the publication of ASC NEPM, 2013), the Canadian SQGs for benzo(a)pyrene were revised later in 2010 (CCME 2010a,b). Therefore, CRC Care Technical Note 39 assesses the benzo(a)pyrene ESL derivation, and derives a higher reliability ESL for benzo(a)pyrene in the Australian setting. The ESLs for benzo(a)pyrene derived by CRC Care (2017) are 33mg/kg for residential and open space land uses, and 172mg/kg for commercial/industrial land uses. These have been considered where benzo(a)pyrene concentrations exceed the ESL, but do not exceed the HIL, to mitigate against unwarranted remediation that is driven by low-reliability ESLs.

Based on the current and proposed site use (open space with sporting fields and amenities buildings) the following investigation levels have been adopted:

- HIL C & HSL C - Public open space (parks, playgrounds, playing fields, secondary schools and footpaths) and;
- EIL C, ESL C – urban residential / public open space.

8.3 Asbestos Materials in Soil

The assessment of known and suspected asbestos contamination in soil is based on:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (April 2013), NEPC 2013, Canberra; and
- *WA DoH 2009 Guidelines of the assessment and management of asbestos contaminated sites in Western Australia, WA Department of Health and Department of Environment and Conservation.*

Schedule B1, Section 4 NEPM (2013) provides guidance on the assessment of both friable and non-friable forms of asbestos in soil. This guidance is based on the WA DoH (2009) Guidelines that presented risk-based screening levels for asbestos in soil under various landuse scenarios.

For the purpose of assessing asbestos impacts in soil, three groups are recognised:

- *Asbestos Containing Material (ACM)* – which is in sound condition although possibly broken or fragmented and the asbestos is bound in a matrix. This is restricted to material that cannot pass through a 7mm x 7mm sieve;
- *Fibrous asbestos (FA)* – friable asbestos material, such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products;
- *Asbestos fines (AF)* – includes free fibres of asbestos, small fibre bundles and also ACM fragments that pass through a 7mm x 7mm sieve.

The adopted health screening levels for asbestos for recreational landuse scenario, is shown in Table 8.3, below.

Table 8.3 Health Screening Levels for Asbestos Contamination in Soil (NEPM 2013)

Form of Asbestos	**Health Screening Level**
	Recreational/Open Space (HSL C)
Bonded ACM (%)	0.02
FA and AF (%)	0.001
All forms of Asbestos	No visible evidence for surface soil (top 10cm)

8.4 Preliminary Waste Classification

In order to provide a preliminary waste classification, the laboratory results were compared to the Contaminant Threshold (CT) and Specific Contaminant Concentration (SCC) values for General and Restricted Solid Waste in the NSW EPA (2014) Waste Classification Guidelines.

9.0 Quality Assurance/Quality Control

Sampling activities were undertaken in accordance with normal, industry accepted practices and standards and carried out by appropriately trained personnel. The assessment of field and laboratory quality assurance / quality control (QA / QC) procedures is provided below, and a data validation report is presented in Appendix E.

9.1 Holding Times

Samples were extracted and analysed within the holding times.

9.2 Field QC Samples

In order to assess field quality assurance / quality control (QA/QC) procedures, the following quality control samples were collected and analysed:

QC Sample	Type	Lab	Analysis
D.17.07.22	Duplicate of BH01 0.0-0.1	Eurofins	TRHs, BTEX, PAHs, Metals.

Primary and intra lab duplicate samples were analysed by the NATA-accredited Eurofins laboratory. The number of duplicate samples collected was in accordance with the ASC NEPM (2013) requirement of at least 1 duplicate per 20 primary samples.

Table 4, Appendix B presents the relative percentage differences (RPDs) between the primary and duplicate soil samples. A review of the Qualtest QA / QC results indicates that RPDs were within the acceptable ranges. It is noted that low concentrations exaggerate the percentage differences with respect to small total concentrations, therefore where results for primary and duplicate sample were less than 10 times the LOR, the RPDs have been disregarded.

9.3 Laboratory QA/QC

The laboratory internal QA/QC reports indicated that the appropriate laboratory QA / QC procedures and rates were undertaken for contamination studies, and that:

- Laboratory blank samples were free of contamination;
- Matrix spike recoveries were within the control limits;
- Laboratory duplicate RPDs were recorded within the laboratory control limits; and
- Surrogates and laboratory control samples were within the laboratories acceptable range.

9.4 Data Usability

Based on the above, and the data validation report in Appendix E, it is considered that the field and laboratory methods for soil sampling are appropriate and that the data obtained is usable and considered to reasonably represent the concentrations at the sampling points at the time of sampling.

10.0 Results

10.1 Subsurface Conditions

The soils observed during drilling are summarised below in Table 10.1 and Table 10.2. The borehole logs are presented in Appendix D.

TABLE 10.1 – Summary of Geotechnical Units and Soil Types

Unit	Soil Type	Description
1A	FILL-TOPSOIL / TOPSOIL	Sandy CLAY – medium to high plasticity, brown, fine to medium grained sand, with some fine grained angular gravel, root affected. Silty SAND / SAND – fine to medium grained, dark grey-brown to dark brown, fines of low plasticity, root affected. Sandy CLAY – low to medium plasticity, dark grey-brown, fine to medium grained sand, root affected.
1B	FILL	Sandy CLAY – medium plasticity, generally dark grey-brown to pale brown, fine to coarse grained sand, with some fine to medium grained angular gravel, with some roots in places. Clayey SAND – fine to medium grained, brown, fines of low plasticity.
2	RESIDUAL SOIL	Sandy CLAY – medium plasticity, brown to orange-brown and pale grey-brown / pale brown and pale red-brown, fine to medium grained sand. CLAY – medium to high plasticity, brown to pale brown with some pale red-brown, with some fine to medium grained sand. Clayey SAND – fine grained, pale orange-brown and pale grey-brown, fines of low plasticity.
3	EXTREMELY WEATHERED ROCK (with soil properties)	Silty Sandstone; breaks down into Clayey SAND – fine to medium grained, pale brown to pale orange-brown, fines of low plasticity.
4	HIGHLY WEATHERED ROCK	Silty SANDSTONE – fine grained, pale grey and pale orange-brown, estimated low to medium strength. SANDSTONE – fine grained, brown.

Table 10.2 – Summary of Geotechnical Units Encountered at Each Borehole Location

Location	Unit 1A FILL-TOPSOIL / TOPSOIL	Unit 1B FILL	Unit 2 Residual Soil	Unit 3 XW Rock	Unit 4 HW Rock
	Depth in metres (m)				
BH03	0.00 – 0.20	0.20 – 0.40	0.40 – 1.10	1.10 – 1.20	1.20 – 1.45*
BH05	-	-	0.00 – 0.70	0.70 – 1.00	1.00 – 1.15*
BH07	0.00 – 0.30	0.30 – 0.40	0.40 – 0.50	-	0.50 – 0.70*
BH01	0.00 – 0.10	0.10 – 0.40	0.40 – 0.80	-	-
BH02	0.00 – 0.10	0.10 – 0.30	0.30 – 0.80	-	-
BH04	0.00 – 0.10	0.10 – 0.40	0.40 – 0.60	-	-
BH06	-	0.00 – 0.40	0.40 – 0.55	-	0.55 – 0.60*
BH08	0.00 – 0.25	-	0.25 – 0.60	-	-
BH09	0.00 – 0.30	0.30 – 0.70	0.70 – 0.80	-	-

* End of hole

No groundwater inflows were observed during drilling.

10.2 Laboratory Results

10.2.1 Onsite Reuse

Soil analytical results are summarised in Table 1, Appendix B. The laboratory analytical reports are also included in Appendix F.

The soil laboratory results were compared to the investigation levels described in Sections 8.2 and 8.3. The analytical results indicated that concentrations of contaminants were reported below the adopted criteria, with the exception of:

- TRH >C16-C34 exceeded the ESL (300mg/kg) in sample BH04 0.0-0.1 (310mg/kg).

For concentrations of TRH >C16-C34 exceeding the adopted ecological screening levels in surface soils, the 95% Upper Confidence Limits (UCLs) of the average concentrations for the sample results were calculated using ProUCL in accordance with the procedures discussed in NEPM (2013) Schedule B2 Section 13 and NSW EPA (1995) Sampling Design Guidelines.

NEPM (2013) Schedule B1, Section 3.2.1 states that:

- *"At the very least, the maximum and 95%UCL of the arithmetic mean contaminant concentration should be compared to the relevant Tier 1 screening criteria"*
- *"The implications of localised elevated values (hotspots) should also be considered. The results should also meet the following criteria:*
    - *The standard deviation of the results should be less than 50% of the relevant investigation or screening level, and*
    - *No single value should exceed 250% of the relevant investigation or screening level."*

Calculation sheets for data statistics, including average, standard deviation and 95%UCL of the average, are attached in Appendix E. ProUCL calculates the UCL comparing a number of different methods, including normal distribution, lognormal distribution, gamma distribution and nonparametric. ProUCL then recommends an appropriate method for the data set.

The 95% UCL calculations showed:

Parameter	**TRH >C16-C34 ESL**
No. of samples	9
Average	156.7
Standard Deviation	76.32
95% UCL	205.8
EIL (mg/kg)	300

The 95% UCL calculations showed the average and the arithmetic average concentration of TRH >C16-C34 is below the adopted criteria.

10.2.3 Preliminary Waste Classification

The waste classification results are summarised in Table 3, Appendix B. The laboratory analytical reports are also included in Appendix F.

The soil laboratory results were compared to the investigation levels described in Section 8.4.

Qualtest followed the six-step process described in Part 1 of the NSW EPA (2014) Waste Classification Guidelines for assessing the classification of the surface soils on the site. According to the waste classification procedure:

- **Step 1 – Is the waste special waste?:** The material assessed is not 'special waste'.
- **Step 2 – Is the waste liquid waste?:** The material assessed is not a 'liquid waste' in its current form. The material requiring offsite disposal was soil and capable of being picked up by a spade or shovel.
- **Step 3 – Is the waste pre-classified?:** The material assessed is not 'pre-classified'.
- **Step 4 – Does the waste possess hazardous characteristics?:** The material assessed does not appear to possess hazardous characteristics from the onsite observations made.
- **Step 5 - Determining a waste's classification using chemical assessment:** The material has been assessed by chemical analyses. Soil analytical results are presented in Table 3, Appendix B. The results show concentrations below the general solid waste criteria without TCLP testing (CT1) with the exception of benzo(a)pyrene in samples BH02 0.0-0.1, BH03 0.0-0.1, BH08 0.0-0.1 and BH09 0.0-0.1 which showed concentrations below general solid waste with TCLP (SCC1/TCLP1), and asbestos was not detected.
- **Step 6 - Is the waste putrescible or non-putrescible?:** The material is composed of soil. NSW EPA (2014) notes that materials that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forestry and crop materials, and natural fibrous organic and vegetative materials. Based on observations by Qualtest, the material is considered to be non-putrescible.

11.0 Conclusions and Recommendations

Based on the results of the work completed as part of this assessment, the in-situ material is considered suitable for onsite reuse in accordance with ASC NEPM 2013 guidelines for public open space land uses.

Based on the preliminary waste classification assessment, the surface soils and fill materials across the site classify as General Solid Waste (non-putrescible). The underlying residual soils and weathered rock would likely classify as Virgin Excavated Natural Material (VENM), as long as they are not mixed with any topsoil, fill, or waste materials.

If conditions other than those encountered during this assessment are uncovered, further assessment by an environmental consultant may be necessary.

This report was prepared in general accordance with the relevant sections of the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra (referred to as ASC NEPM 2013), and NSW EPA (2014) Waste Classification Guidelines.

12.0 Limitations

This report has been prepared by Qualtest for EJE Architecture Pty Ltd on behalf of Maitland City Council based on the objectives and scope of work listed in Sections 1.1 and 1.2. No warranty, expressed or implied, is made as to the information and professional advice included in this report. Anyone using this document does so at their own risk and should satisfy themselves concerning its applicability and, where necessary, should seek expert advice in relation to their particular situation.

The opinions, conclusions and recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. Qualtest has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

In preparing this report Qualtest has relied on information contained in searches of government websites and has not independently verified or checked the data contained on these websites.

In preparing this report, current guidelines for assessment and management of contaminated land were followed.

Site conditions may change after the date of this Report. Qualtest does not accept responsibility arising from, or in connection with, any change to the site conditions.

13.0 References

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

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

NSW Department of Primary Industries (Office of Water) Registered Groundwater Bore Map, accessed from http://allwaterdata.water.nsw.gov.au/water.stm, accessed on 22 July 2022

NSW Land and Property Information, Spatial Information eXchange (SIX) Maps - Topographic Map, accessed from https://maps.six.nsw.gov.au/, accessed on 22 July 2022

NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Land.

NSW EPA (1995) Sampling Design Guidelines.

NSW EPA (2014) Waste Classification Guidelines.

NSW ePlanning Spatial Viewer Portal (https://www.planningportal.nsw.gov.au/spatialviewer/)

NSW Spatial Portal - Historical Imagery (https://portal.spatial.nsw.gov.au/portal/apps/

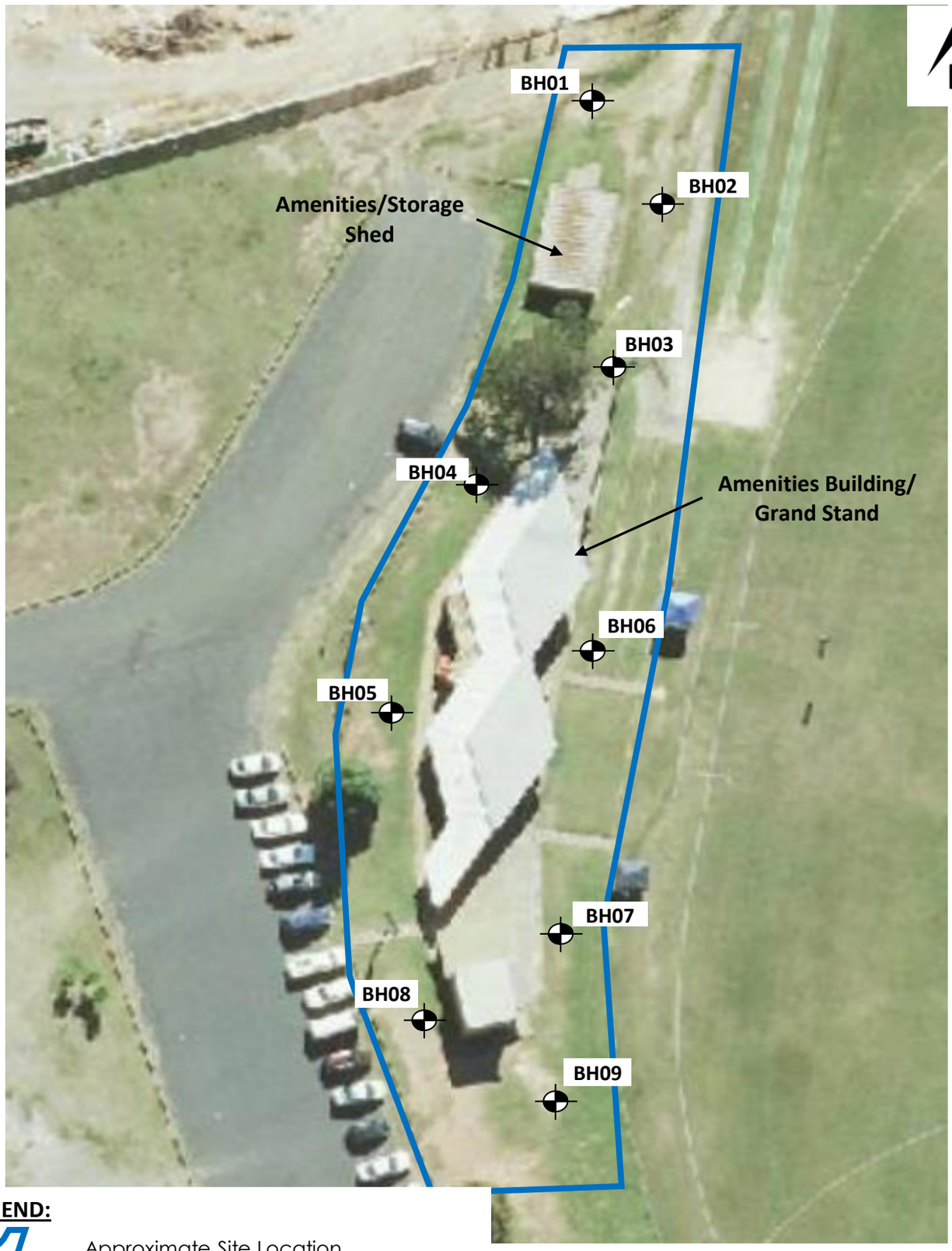
APPENDIX A:

Figures

Image obtained from Sixmaps (https://maps.six.nsw.gov.au/) 8 August 2022

Qualtest LABORATORY (NSW) PTY LTD

Client:	EJE ARCHITECTURE PTY LTD	Drawing No:	FIGURE 1
Project:	PROPOSED AMENITIES UPGRADE	Project No:	NEW22P-0130-AA
Location:	MAX MCMAHON OVAL, RUTHERFORD	Scale:	N.T.S
Title:	SITE LOCATION	Date:	8/08/2022



LEGEND:

Approximate Site Location

Approximate Borehole Locations

Approx. Scale Bar

0m 12.5m 25m 50m

Location overlain approximately on Google Earth image by Qualtest

Qualtest LABORATORY (NSW) PTY LTD	Client:	EJE ARCHITECTURE PTY LTD	Drawing No:	FIGURE 2
	Project:	PROPOSED AMENITIES UPGRADE	Project No:	NEW22P-0130
	Location:	MAX MCMAHON OVAL, RUTHERFORD	Scale:	AS SHOWN
	Title:	SITE FEATURES AND SAMPLE LOCATIONS	Date:	8/08/2022

APPENDIX B:

Analytical Results Tables

EJE Architecture Pty Ltd
NEW22P-0130

Table 1: Onsite Reuse Analytical Results
Max McMahon Oval, Rutherford, NSW

						Field ID	BH01 0.0-0.1	BH02 0.0-0.1	BH03 0.0-0.1	BH04 0.0-0.1	BH05 0.0-0.1	BH06 0.0-0.1	BH07 0.0-0.1	BH08 0.0-0.1	BH09 0.0-0.1
						Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Analytes		Units	LOR	HIL/HSL C	HSL C	EIL/ESL C									
Metals	Arsenic	mg/kg	2	300		100	5.6	2.8	6.9	4.1	13	5	8.1	5.8	6.6
	Cadmium	mg/kg	0.4	90			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Chromium	mg/kg	5	300		580*	19	12	19	11	31	21	26	37	37
	Copper	mg/kg	5	17000		210*	< 5	7.3	9.6	18	< 5	9.8	13	18	8.7
	Lead	mg/kg	5	600		1100	14	8.5	14	13	12	11	15	14	9.8
	Mercury	mg/kg	0.1	80			< 0.1	< 0.1	2.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Nickel	mg/kg	5	1200		170*	5.9	10	14	7.9	5.6	14	16	27	15
	Zinc	mg/kg	5	30 000		480*	21	87	140	79	37	97	75	70	39
PAH	Acenaphthene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthylene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Anthracene	mg/kg	0.5				< 0.5	< 2	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 1
	Benz(a)anthracene	mg/kg	0.5				< 0.5	1	0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 2
	Benzo(a)pyrene	mg/kg	0.5				< 0.5	1.1	1.4	0.6	< 0.5	< 0.5	< 0.5	2	2.6
	Benzo(a)pyrene TEQ	mg/kg	0.6	3		33	0.6	< 2	2.1	< 1	0.6	0.6	0.6	1.6	1.9
	Benzo(b&j)fluoranthene	mg/kg	0.5				< 0.5	0.7	0.7	< 0.5	< 0.5	< 0.5	0.5	1.5	2
	Benzo(g.h.i)perylene	mg/kg	0.5				< 0.5	< 2	< 2	< 1	< 0.5	< 0.5	< 0.5	< 5	< 5
	Benzo(k)fluoranthene	mg/kg	0.5				< 0.5	1.3	1.3	0.6	< 0.5	< 0.5	< 0.5	2.2	2.4
	Chrysene	mg/kg	0.5				< 0.5	1.2	1.4	0.6	< 0.5	< 0.5	< 0.5	1.5	1.3
	Dibenz(a.h)anthracene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5
	Fluoranthene	mg/kg	0.5				0.6	2.9	3	1	< 0.5	< 0.5	0.6	3.6	2.2
	Fluorene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5				< 0.5	0.7	0.9	< 0.5	< 0.5	< 0.5	< 0.5	1.8	2.8
	Naphthalene	mg/kg	0.5		NL	370	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Phenanthrene	mg/kg	0.5				< 0.5	< 2	0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 2
	Pyrene	mg/kg	0.5				< 0.5	1.7	1.5	0.5	< 0.5	< 0.5	< 0.5	< 5	< 5
	Total PAH*	mg/kg	0.5	300			0.6	11	12	3.3	< 0.5	< 0.5	1.1	13	14
BTEX	Benzene	mg/kg	0.1		NL	50	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Ethylbenzene	mg/kg	0.1		NL	70	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Toluene	mg/kg	0.1		NL	85	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Xylenes - Total	mg/kg	0.3		NL	105	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
TRH	Naphthalene	mg/kg	0.5		NL	170	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	TRH C6-C10	mg/kg	20			180	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	TRH C6-C10 less BTEX (F1)	mg/kg	20		NL		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	TRH >C10-C16	mg/kg	50			120	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50		NL		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
	TRH >C16-C34	mg/kg	100			300	< 100	< 200	130	310	< 100	100	< 100	240	130
	TRH >C34-C40	mg/kg	100			2800	< 100	< 100	< 100	140	< 100	< 100	< 100	120	< 100
Asbestos	Asbestos	%w/w	0.001	Detected			ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes

* EIL based on pH of 6, CEC of 10meq/100ml, and clay content 30%.
ND Not Detected
NL Non Limiting
Result Concentration exceeds adopted human health critieria
Result Concentration exceeds adopted ecological criteria

1 ASC NEPM (2013) - Health Investigation Levels (recreational/open space)
2 ASC NEPM (2013) - Soil Health Screening Levels for Vapour Intrusion, recreational/open space, Clay 0m to <1m
3 ASC NEPM (2013) - Ecological Investigation and Screening Levels (recreational/open space)

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Table 2: Soil Analytical Results - Asbestos
Max McMahon Oval, Rutherford, NSW

Sample ID	Matrix	Sample Date	ACM weight (g)	ACM weight (kg)	Soil density (kg/L)	Soil Volume (L)	Asbestos Content (%)	%w/w ACM in Soil	HSL-C	%w/w FA/AF in Soil	HSL-C
BH01 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	ND	0.001
BH02 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	-	0.001
BH03 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	-	0.001
BH04 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	ND	0.001
BH05 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	-	0.001
BH06 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	-	0.001
BH07 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	-	0.001
BH08 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	-	0.001
BH09 0.0-0.1	Soil	14/07/2022	0	0	1.8	10	15	0.000	0.02	ND	0.001

Notes:
%w/w asbestos in soil calculated using: % asbestos content x bonded ACM (kg) / soil volume (L) x soil density (kg/L)
ND = asbestos not detected

Result
Result

Criteria from ASC NEPM (2013) Table 7 - Health Screening Level (HSL) for Asbestos, High Density Residential Land Use

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Table 3: Waste Classification Analytical Results
Max McMahon Oval, Rutherford, NSW

						Field ID	BH01 0.0-0.1	BH02 0.0-0.1	BH03 0.0-0.1	BH04 0.0-0.1	BH05 0.0-0.1	BH06 0.0-0.1	BH07 0.0-0.1	BH08 0.0-0.1	BH09 0.0-0.1
						Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Analytes		Units	LOR	General Solid Waste without TCLP	General Solid Waste with TCLP										
				CT1	SCC1	TCLP1									
Metals	Arsenic	mg/kg	2	100			5.6	2.8	6.9	4.1	13	5	8.1	5.8	6.6
	Cadmium	mg/kg	0.4	20			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Chromium	mg/kg	5	100			19	12	19	11	31	21	26	37	37
	Copper	mg/kg	5				< 5	7.3	9.6	18	< 5	9.8	13	18	8.7
	Lead	mg/kg	5	100			14	8.5	14	13	12	11	15	14	9.8
	Mercury	mg/kg	0.1	4			< 0.1	< 0.1	2.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Nickel	mg/kg	5	40			5.9	10	14	7.9	5.6	14	16	27	15
	Zinc	mg/kg	5				21	87	140	79	37	97	75	70	39
PAH	Acenaphthene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Acenaphthylene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Anthracene	mg/kg	0.5				< 0.5	< 2	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 1
	Benz(a)anthracene	mg/kg	0.5				< 0.5	1	0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 2
	Benzo(a)pyrene	mg/kg	0.5	0.8	10		< 0.5	1.1	1.4	0.6	< 0.5	< 0.5	< 0.5	2	2.6
	Benzo(a)pyrene TCLP	mg/L	0.001			0.04	-	-	-	-	-	-	-	-	< 0.001
	Benzo(a)pyrene TEQ	mg/kg	0.6				0.6	< 2	2.1	< 1	0.6	0.6	0.6	< 5	< 5
	Benzo(b&j)fluoranthene	mg/kg	0.5				< 0.5	0.7	0.7	< 0.5	< 0.5	< 0.5	0.5	1.5	2
	Benzo(g.h.i)perylene	mg/kg	0.5				< 0.5	< 2	< 2	< 1	< 0.5	< 0.5	< 0.5	< 5	< 5
	Benzo(k)fluoranthene	mg/kg	0.5				< 0.5	1.3	1.3	0.6	< 0.5	< 0.5	< 0.5	2.2	2.4
	Chrysene	mg/kg	0.5				< 0.5	1.2	1.4	0.6	< 0.5	< 0.5	< 0.5	1.5	1.3
	Dibenz(a.h)anthracene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5
	Fluoranthene	mg/kg	0.5				0.6	2.9	3	1	< 0.5	< 0.5	0.6	3.6	2.2
	Fluorene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5				< 0.5	0.7	0.9	< 0.5	< 0.5	< 0.5	< 0.5	1.8	2.8
	Naphthalene	mg/kg	0.5				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Phenanthrene	mg/kg	0.5				< 0.5	< 2	0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 2
	Pyrene	mg/kg	0.5				< 0.5	1.7	1.5	0.5	< 0.5	< 0.5	< 0.5	< 5	< 5
	Total PAH*	mg/kg	0.5	200			0.6	11	12	3.3	< 0.5	< 0.5	1.1	13	14
BTEX	Benzene	mg/kg	0.1	10			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Ethylbenzene	mg/kg	0.1	600			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Toluene	mg/kg	0.1	288			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Xylenes - Total	mg/kg	0.3	1000			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
TRH	TRH C6-C9	mg/kg	20	650			< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	TRH C10-C14	mg/kg	20				< 20	< 20	< 20	< 200	< 20	< 20	< 20	< 20	< 20
	TRH C15-C28	mg/kg	50				< 50	< 100	78	< 500	< 50	< 100	< 50	150	73
	TRH C29-C36	mg/kg	50				< 50	80	78	< 500	< 50	62	< 50	140	92
	TRH C10-36 (Total)	mg/kg	50	10000			< 50	< 100	156	< 500	< 50	< 100	< 50	290	165
Asbestos	Asbestos	%w/w	-	Detected			ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

Value	Result exceeds criteria for General Solid Waste without TCLP (CT1)
Value	Result exceeds criteria for General Solid Waste (with TCLP)
Value	Asbestos Detected
ND	Not detected

Criteria from NSW EPA (2014) Waste Classification Guidelines, Tables 1 and 2

EJE Architecture Pty Ltd
NEW22P-0130

Table 4 - Quality Control Results
Max McMahon Oval, Rutherford, NSW

		Field ID		BH01 0.0-0.1	D.14.7.22	RPD%
		Date		14/07/2022	14/07/2022	
Analytes		Units	LOR			
Metals	Arsenic	mg/kg	2	5.6	6.6	16
	Cadmium	mg/kg	0.4	< 0.4	< 0.4	0
	Chromium	mg/kg	5	19	22	15
	Copper	mg/kg	5	< 5	< 5	0
	Lead	mg/kg	5	14	18	25
	Mercury	mg/kg	5	< 0.1	< 0.1	0
	Nickel	mg/kg	5	5.9	9.7	49
	Zinc	mg/kg	5	21	29	32
PAHs	Acenaphthene	mg/kg	0.5	< 0.5	< 0.5	0
	Acenaphthylene	mg/kg	0.5	< 0.5	< 0.5	0
	Anthracene	mg/kg	0.5	< 0.5	< 0.5	0
	Benz(a)anthracene	mg/kg	0.5	< 0.5	< 0.5	0
	Benzo(a)pyrene	mg/kg	0.5	< 0.5	< 0.5	0
	Benzo(a)pyrene TEQ(Medium bound)	mg/kg	0.6	0.6	0.6	0
	Benzo(b&j)fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0
	Benzo(g.h.i)perylene	mg/kg	0.5	< 0.5	< 0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0
	Chrysene	mg/kg	0.5	< 0.5	< 0.5	0
	Dibenz(a.h)anthracene	mg/kg	0.5	< 0.5	< 0.5	0
	Fluoranthene	mg/kg	0.5	0.6	0.6	0
	Fluorene	mg/kg	0.5	< 0.5	< 0.5	0
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5	< 0.5	< 0.5	0
	Naphthalene	mg/kg	0.5	< 0.5	< 0.5	0
	Phenanthrene	mg/kg	0.5	< 0.5	< 0.5	0
	Pyrene	mg/kg	0.5	< 0.5	< 1	0
	Total PAH*	mg/kg	0.5	0.6	1	50
BTEX	Benzene	mg/kg	0.1	< 0.1	< 0.1	0
	Toluene	mg/kg	0.1	< 0.1	< 0.1	0
	Ethylbenzene	mg/kg	0.1	< 0.1	< 0.1	0
	Xylenes - Total	mg/kg	0.3	< 0.3	< 0.3	0
TRH	TRH C6-C9	mg/kg	20	< 20	< 20	0
	TRH C10-C14	mg/kg	20	< 20	< 20	0
	TRH C15-C28	mg/kg	50	< 50	< 100	0
	TRH C29-C36	mg/kg	50	50	60	18
	TRH C10-36 (Total)	mg/kg	50	< 50	< 100	0

Notes

Bold Relative percentage difference outside the acceptable limits (<10 X LOR = no limit, >10 X LOR = 30%).

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.19/08/2022 2:18:23 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C1

General Statistics

Total Number of Observations	9	Number of Distinct Observations	5
		Number of Missing Observations	2
Minimum	100	Mean	156.7
Maximum	310	Median	130
SD	76.32	Std. Error of Mean	25.44
Coefficient of Variation	0.487	Skewness	1.265

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	204	95% Adjusted-CLT UCL (Chen-1995)	210
		95% Modified-t UCL (Johnson-1978)	205.8

Gamma GOF Test

A-D Test Statistic	0.818	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.723	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.28	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.677	k star (bias corrected MLE)	3.859
Theta hat (MLE)	27.59	Theta star (bias corrected MLE)	40.6
nu hat (MLE)	102.2	nu star (bias corrected)	69.46
MLE Mean (bias corrected)	156.7	MLE Sd (bias corrected)	79.75
		Approximate Chi Square Value (0.05)	51.28
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	48

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	212.2	95% Adjusted Gamma UCL (use when n<50)	226.7

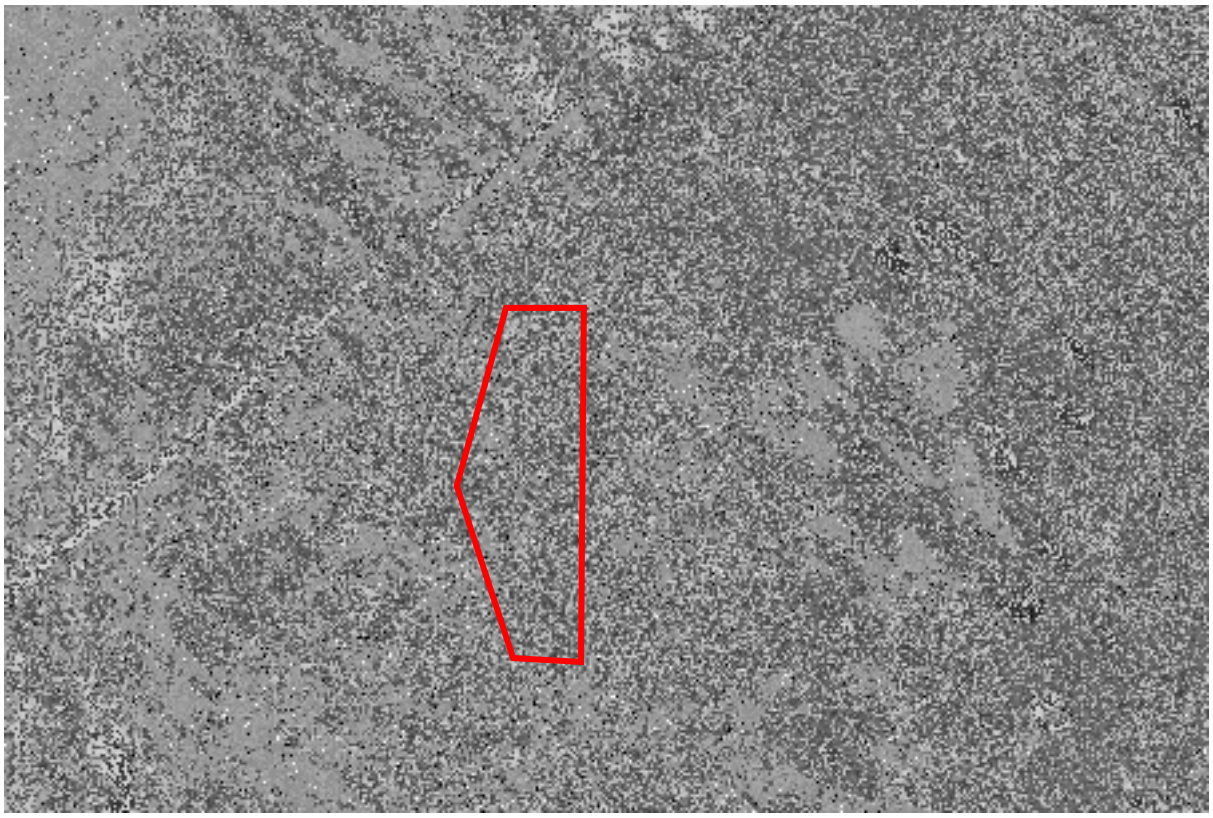
56	**Lognormal GOF Test**											
57	Shapiro Wilk Test Statistic			0.819			**Shapiro Wilk Lognormal GOF Test**					
58	5% Shapiro Wilk Critical Value			0.829			Data Not Lognormal at 5% Significance Level					
59	Lilliefors Test Statistic			0.254			**Lilliefors Lognormal GOF Test**					
60	5% Lilliefors Critical Value			0.274			Data appear Lognormal at 5% Significance Level					
61	**Data appear Approximate Lognormal at 5% Significance Level**											
62												
63	**Lognormal Statistics**											
64	Minimum of Logged Data			4.605			Mean of logged Data			4.963		
65	Maximum of Logged Data			5.737			SD of logged Data			0.434		
66												
67	**Assuming Lognormal Distribution**											
68	95% H-UCL			219.4			90% Chebyshev (MVUE) UCL			223.8		
69	95% Chebyshev (MVUE) UCL			254.7			97.5% Chebyshev (MVUE) UCL			297.7		
70	99% Chebyshev (MVUE) UCL			382								
71												
72	**Nonparametric Distribution Free UCL Statistics**											
73	Data appear to follow a Discernible Distribution at 5% Significance Level											
74												
75	**Nonparametric Distribution Free UCLs**											
76	95% CLT UCL			198.5			95% Jackknife UCL			204		
77	95% Standard Bootstrap UCL			195.3			95% Bootstrap-t UCL			233.4		
78	95% Hall's Bootstrap UCL			204.4			95% Percentile Bootstrap UCL			198.9		
79	95% BCA Bootstrap UCL			206.7								
80	90% Chebyshev(Mean, Sd) UCL			233			95% Chebyshev(Mean, Sd) UCL			267.6		
81	97.5% Chebyshev(Mean, Sd) UCL			315.5			99% Chebyshev(Mean, Sd) UCL			409.8		
82												
83	**Suggested UCL to Use**											
84	95% Student's-t UCL			204			or 95% Modified-t UCL			205.8		
85	or 95% H-UCL			219.4								
86												
87	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
88	Recommendations are based upon data size, data distribution, and skewness.											
89	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
90	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
91												
92	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.											
93	H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.											
94	It is therefore recommended to avoid the use of H-statistic based 95% UCLs.											
95	Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.											
96												

APPENDIX C:

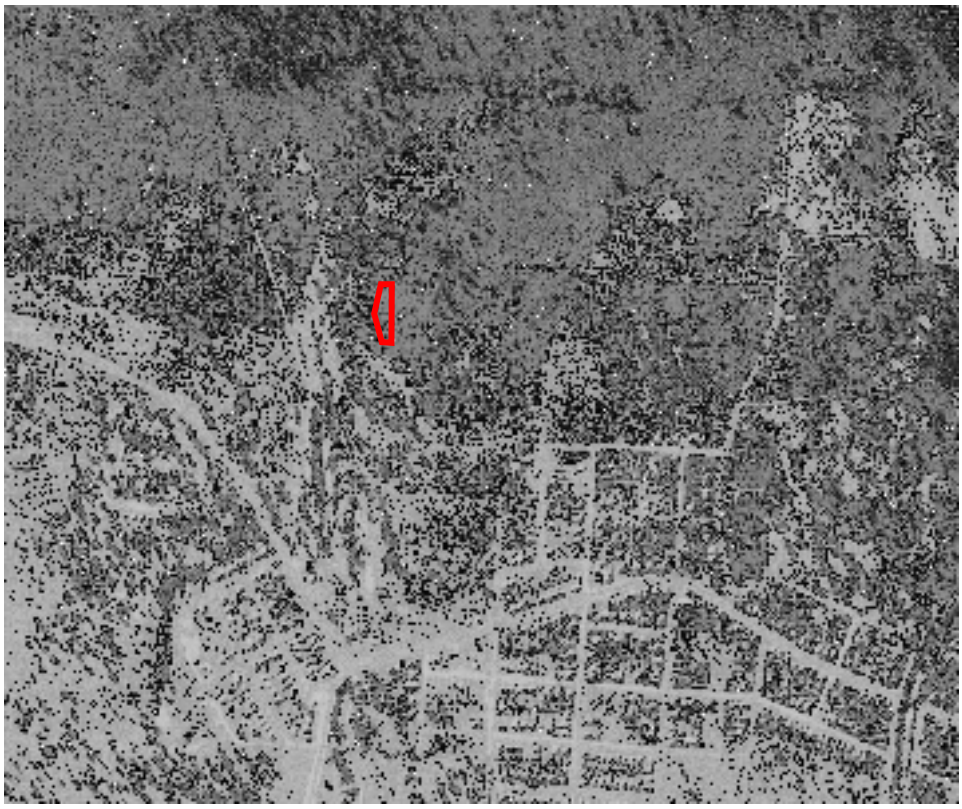
Desktop Searches

Aerial Photographs – Max McMahon Oval, Rutherford – NEW22P-0130

1944

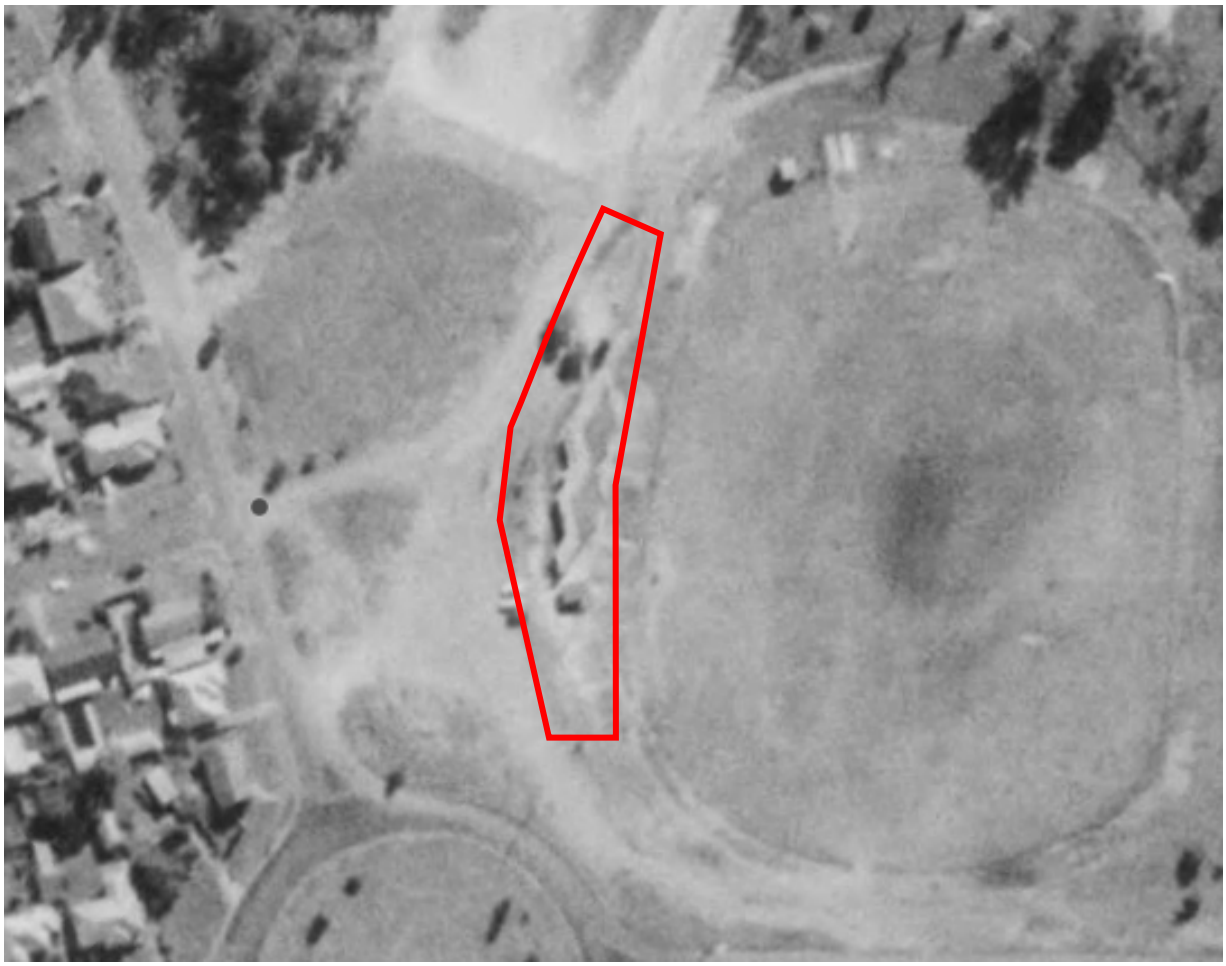


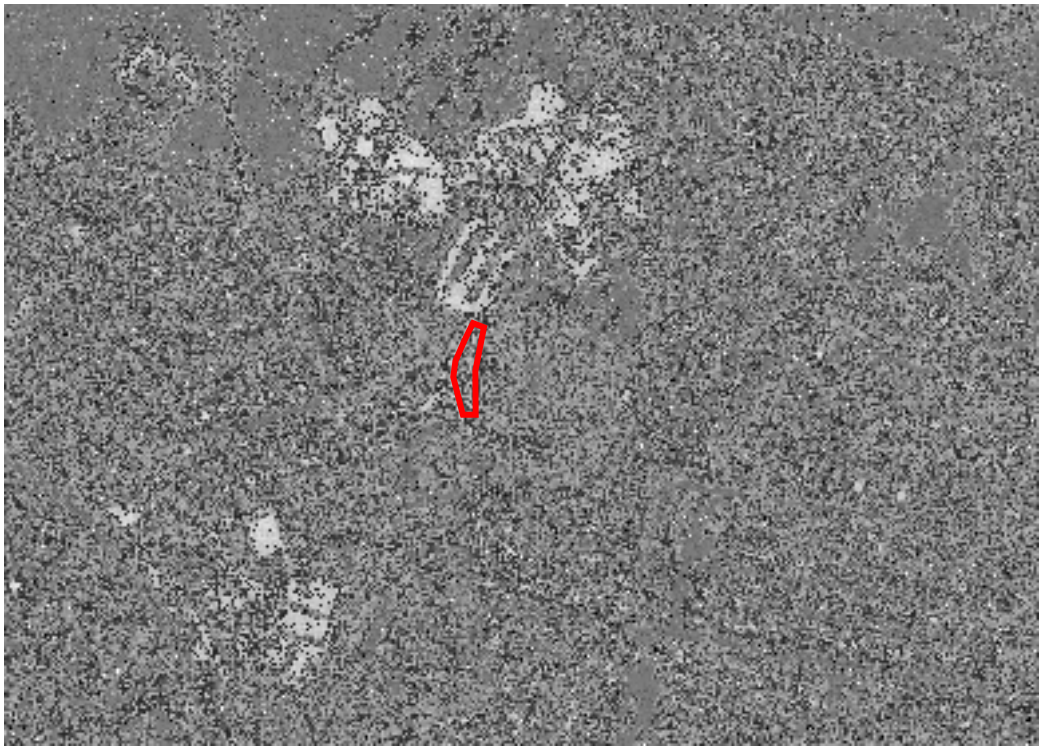
1954



1974

1984





1993

2001

2010

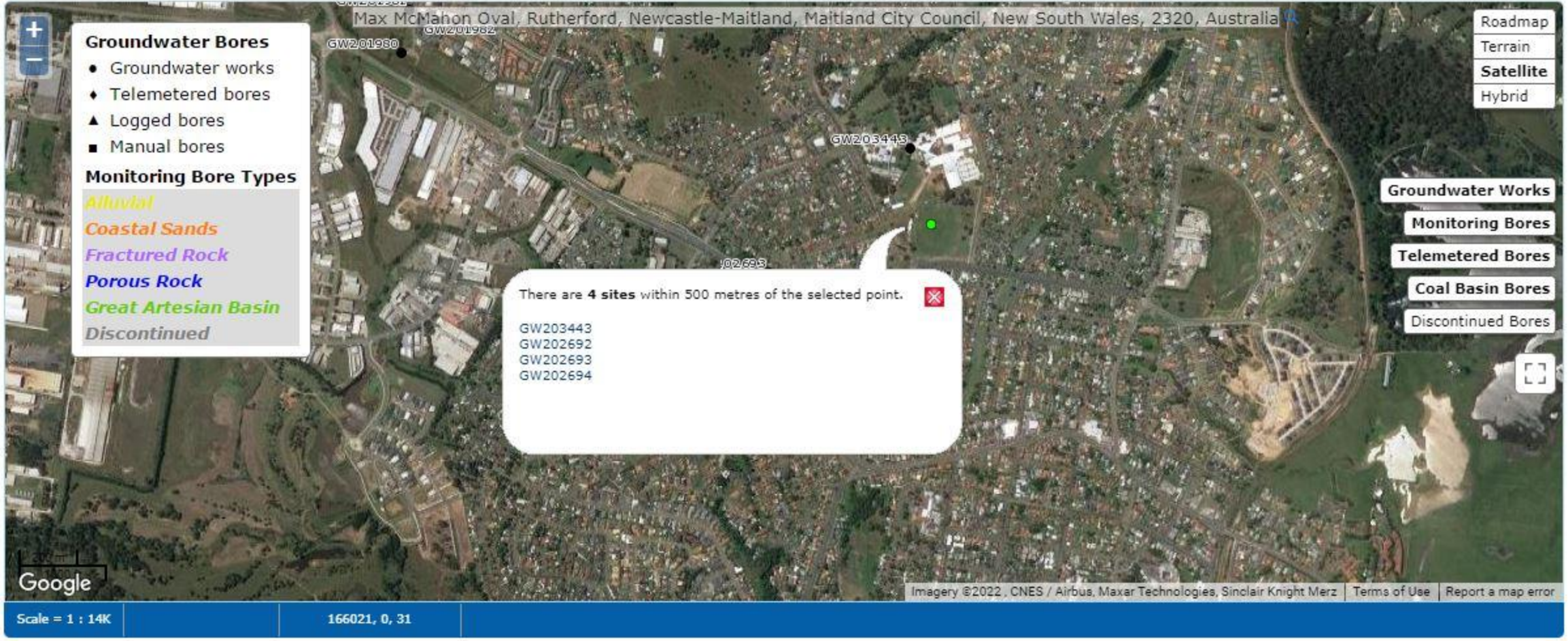
2022

ALL GROUNDWATER MAP

bookmark this page

All data times are Eastern Standard Time

Map | Info



Scale = 1 : 14K | 166021, 0, 31

WaterNSW
Work Summary

GW202692

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method: Auger - Solid
Owner Type: Private

Commenced Date:
Completion Date: 16/08/2011
Final Depth: 9.00 m
Drilled Depth: 9.00 m

Contractor Name: Groundtruth Pty Ltd
Driller: Simon Carl Lott
Assistant Driller: Hayden Hopley

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	GOSFO	2//517903
Licensed:			

Region: 20 - Hunter
River Basin: 210 - HUNTER RIVER
Area/District:
CMA Map: 9232-4S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6379405.000
Easting: 361770.000
Latitude: 32°42'52.1"S
Longitude: 151°31'30.3"E

GS Map: -
MGA Zone: 56
Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	9.00	114			Auger - Solid Flight
1		Annulus	Cement	0.00	0.20	114	60		PL:Poured/Shovelled
1		Annulus	Bentonite	0.20	5.50	114	60		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	5.50	9.00	114	60		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	6.00	60	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	6.00	9.00	60		0	Mechanically Slotted, PVC Class 18, Screwed, SL: 40.0mm, A: 0.50mm

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.50	0.50	Silty Clay; red, dry, low plasticity	Silty Clay	
0.50	1.00	0.50	Silty Clay; brown, moist, very high plasticity	Silty Clay	
1.00	2.00	1.00	Silty Clay; dark brown	Silty Clay	

2.00	3.50	1.50	Silty Clay; light brown	Silty Clay	
3.50	8.00	4.50	Silt, Clayey; red, dry, trace plasticity	Silt	
8.00	9.00	1.00	Silty Clay; grey, dry, high plasticity, @ 9m refusal	Silty Clay	

Remarks

16/08/2011: Form A Remarks:
Nat Carling, 4-Nov-2013; GPS provided by the drillers.

***** End of GW202692 *****

WaterNSW
Work Summary

GW202693

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method: Auger - Solid
Owner Type: Private

Commenced Date:
Completion Date: 16/08/2011
Final Depth: 7.50 m
Drilled Depth: 7.50 m

Contractor Name: Groundtruth Pty Ltd
Driller: Simon Carl Lott
Assistant Driller: Hayden Hopley

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	GOSFO	2//517903
Licensed:			

Region: 20 - Hunter
River Basin: 210 - HUNTER RIVER
Area/District:
CMA Map: 9232-4S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6379408.000
Easting: 361767.000
Latitude: 32°42'52.0"S
Longitude: 151°31'30.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	7.50	114			Auger - Solid Flight
1		Annulus	Cement	0.00	0.20	114	60		PL:Poured/Shovelled
1		Annulus	Bentonite	0.20	4.00	114	60		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	4.00	7.50	114	60		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	4.50	60	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	4.50	7.50	60		0	Mechanically Slotted, PVC Class 18, Screwed, SL: 40.0mm, A: 0.50mm

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	Silt, Clayey; brown, dry, trace plasticity, @ 1m trace gravel	Silt	
1.00	7.50	6.50	Silty Clay; brown, dry, high plasticity, @ 3m	Silty Clay	

			brown-grey, @ 4.5m grey, mottled red, @ 5m grey, @ 6.5m brown, @ 7.5m refu		

Remarks

16/08/2011: Form A Remarks:
Nat Carling, 4-Nov-2013; GPS provided by the drillers.

***** End of GW202693 *****

WaterNSW
Work Summary

GW202694

Licence:
Licence Status:
Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method: Auger - Solid
Owner Type: Private

Commenced Date:
Completion Date: 16/08/2011
Final Depth: 7.45 m
Drilled Depth: 6.50 m

Contractor Name: Groundtruth Pty Ltd
Driller: Simon Carl Lott
Assistant Driller: Hayden Hopley

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	GOSFO	1//517903
Licensed:			

Region: 20 - Hunter
River Basin: 210 - HUNTER RIVER
Area/District:
CMA Map: 9232-4S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6379372.000
Easting: 361764.000
Latitude: 32°42'53.1"S
Longitude: 151°31'30.0"E

GS Map: -
MGA Zone: 56
Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	7.45	114			Auger - Solid Flight
1		Annulus	Cement	0.00	0.20	114	60		PL:Poured/Shovelled
1		Annulus	Bentonite	0.20	4.00	114	60		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	4.00	7.45	114	60		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	0.00	4.45	60	50		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	4.45	7.45	60		0	Mechanically Slotted, PVC Class 18, Screwed, SL: 40.0mm, A: 0.50mm

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.50	0.50	Silty Clay; grey mottled red, dry, very high plasticity	Silty Clay	
0.50	2.50	2.00	Silt, Sandy; trace sand, red, dry, low plasticity	Silt	

2.50	6.50	4.00	Silt, Clayey; red, dry, medium plasticity, @ 7m brown, @ 7.45m refusal	Silt	

Remarks

16/08/2011: Form A Remarks:
Nat Carling, 4-Nov-2013; GPS provided by the drillers.

***** End of GW202694 *****

WaterNSW
Work Summary

GW203443

Licence: 20CA217091 **Licence Status:** CURRENT

Authorised Purpose(s): IRRIGATION,STOCK
Intended Purpose(s): STOCK, IRRIGATION

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Down Hole Hamm
Owner Type: School

Commenced Date:
Completion Date: 01/06/2015
Final Depth: 90.00 m
Drilled Depth: 90.00 m

Contractor Name: Ace drilling
Driller: David Mayled
Assistant Driller:

Property: RUTHERFORD TECHNOLOGY HIGH AVERY STREET RUTHERFORD 2320
GWMA: -
GW Zone: -
Standing Water Level (m):
Salinity Description:
Yield (L/s): 3.125

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	GOSFO	1//712760
Licensed:	NORTHUMBERLAND	GOSFORTH	Whole Lot 1//712760

Region: 20 - Hunter
River Basin: 210 - HUNTER RIVER
Area/District:
CMA Map: 9232-4S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6379795.000
Easting: 362196.000
Latitude: 32°42'39.6"S
Longitude: 151°31'46.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	7.00	220			Down Hole Hammer
1		Hole	Hole	7.00	90.00	203			Down Hole Hammer
1	1	Casing	Pvc Class 9	0.00	90.00	150	132		Seated on Bottom, Riveted and Glued, S: 84.00-90.00m
1	1	Casing	Galvinised Steel	0.00	7.00	220	208		
1	1	Opening	Slots - Vertical	60.00	84.00	150		0	Casing - Hand Sawn Slot, PVC Class 9, Riveted and Glued, SL: 130.0mm, A: 2.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
60.00	61.00	1.00	Unknown			0.63			

65.00	67.00	2.00	Unknown			2.50				

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	Topsoil; dark	Topsoil	
1.00	3.00	2.00	Loam	Loam	
3.00	7.00	4.00	Clay; red	Clay	
7.00	90.00	83.00	Sandstone; light grey	Sandstone	

Remarks

01/06/2015: Nat Carling, 15-Sept-2015; No location was provided, based in the centre of the authorised land. Map sent to owner for true location. Adjusted hole diameter to fit casing protector.

***** End of GW203443 *****

APPENDIX D:

Logs

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH01

CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE **PAGE:** 1 OF 1

PROJECT: PROPOSED SPORTS AMENITIES BUILDING **JOB NO:** NEW22P-0130

LOCATION: MAX MCMAHON OVAL, RUTHERFORD **LOGGED BY:** BS

DATE: 14/7/22

DRILL TYPE: 2.7 TONNE EXCAVATOR **SURFACE RL:**

BOREHOLE DIAMETER: 300 mm **DATUM:**

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.10m				CH	FILL-TOPSOIL: Sandy CLAY - medium to high plasticity, brown, fine to medium grained sand, root affected.					FILL - TOPSOIL
							0.10m					
						CI	FILL: Sandy CLAY - medium plasticity, brown, fine to medium grained.					FILL
		0.40m					0.40m	$M > w_P$				
		E 0.50m		0.5		CI	Sandy CLAY - medium plasticity, brown to orange-brown, fine grained sand.			HP	320	RESIDUAL SOIL
							Increasing sand content.		VSt	HP	300	
							0.80m					
							Hole Terminated at 0.80 m Limit Of Required Investigation					
				1.0								
				1.5								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH02
PAGE: 1 OF 1
JOB NO: NEW22P-0130
LOGGED BY: BS
DATE: 14/7/22

CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE
PROJECT: PROPOSED SPORTS AMENITIES BUILDING
LOCATION: MAX MCMAHON OVAL, RUTHERFORD

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm
SURFACE RL:
DATUM:

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
E		E 0.10m				SP	FILL-TOPSOIL: SAND - fine to medium grained, dark brown, with some fines of low plasticity.					FILL - TOPSOIL
							0.10m					
						SC	FILL: Clayey SAND - fine to medium grained, brown, fines of low plasticity.	M				FILL
		0.30m					Shoelace in fill at 0.25m.					
							0.30m					
		E 0.40m				CH	CLAY - medium to high plasticity, brown to pale brown with some pale red-brown.	M > w_P	St - VSt	HP	190	RESIDUAL SOIL
				0.5						HP	240	
							0.60m					
						Cl	Sandy CLAY - medium plasticity, pale brown and pale red-brown, fine grained sand, with some silt.	M < w_P	VSt	HP	380	
							0.80m					
							Hole Terminated at 0.80 m Limit Of Required Investigation					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH03
PAGE: 1 OF 1
JOB NO: NEW22P-0130
LOGGED BY: BB
DATE: 14/7/22

CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE
PROJECT: PROPOSED SPORTS AMENITIES BUILDING
LOCATION: MAX MCMAHON OVAL, RUTHERFORD

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm
SURFACE RL:
DATUM:

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.10m				CL	FILL-TOPSOIL: Sandy CLAY - low to medium plasticity, dark grey-brown, fine to medium grained sand, trace fine grained angular gravel, root affected.					FILL - TOPSOIL
							0.20m					
						CI	FILL: Sandy CLAY - medium plasticity, pale brown, fine to coarse grained sand, with some fine to medium grained angular gravel.					FILL
		0.40m					0.40m					
		E 0.50m		0.5		CH	CLAY - medium to high plasticity, red-brown, trace pale grey and pale grey-brown, with some fine to medium grained sand.	$M > w_P$		HP	230	RESIDUAL SOIL
		U50								HP	300	
		0.70m										
							0.75m		VSt			
							Sandy CLAY - medium plasticity, pale brown to pale orange-brown and pale grey-brown, with some red-brown, fine to medium grained sand.			HP	320	
						CI						
				1.0						HP	250	
							1.10m					
						SC	Clayey SAND - fine grained, pale orange-brown and pale grey-brown, fines of low plasticity.	M	D - VD			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
							1.20m					
							Silty SANDSTONE - fine grained, pale grey and pale orange-brown, estimated low strength.	D				HIGHLY WEATHERED ROCK
							Estimated low to medium strength.					
							1.45m					
				1.5			Hole Terminated at 1.45 m Practical Refusal					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH04**
PAGE: 1 OF 1
JOB NO: NEW22P-0130
LOGGED BY: BB
DATE: 14/7/22

CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE
PROJECT: PROPOSED SPORTS AMENITIES BUILDING
LOCATION: MAX MCMAHON OVAL, RUTHERFORD

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm
SURFACE RL:
DATUM:

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.10m				SC	FILL-TOPSOIL: Silty SAND - fine to medium grained, dark grey-brown, fines of low plasticity, root affected. 0.10m	M				FILL - TOPSOIL
		0.40m				CI	FILL: Sandy CLAY - medium plasticity, dark grey-brown, with some red-brown and trace pale orange-brown and grey, fine to coarse grained sand, trace fine grained angular gravel, with some roots. 0.40m	M > w_P				FILL
		E 0.50m		0.5		CH	CLAY - medium to high plasticity, red-brown, with some pale brown, with some fine to medium grained sand. 0.60m		VSt	HP	300	RESIDUAL SOIL
				1.0			Hole Terminated at 0.60 m Limit Of Required Investigation					
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH05

CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE **PAGE:** 1 OF 1

PROJECT: PROPOSED SPORTS AMENITIES BUILDING **JOB NO:** NEW22P-0130

LOCATION: MAX MCMAHON OVAL, RUTHERFORD **LOGGED BY:** BB

DATE: 14/7/22

DRILL TYPE: 2.7 TONNE EXCAVATOR **SURFACE RL:**

BOREHOLE DIAMETER: 300 mm **DATUM:**

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
E		E 0.10m				CH	CLAY - medium to high plasticity, pale brown to pale orange-brown, with some pale grey, with some fine to medium grained sand.					RESIDUAL SOIL
							0.20m					
		0.40m				CL	Sandy CLAY - low to medium plasticity, pale brown and pale grey-brown, fine grained sand.	M > w_P	VSt	HP	280	
		U50 0.55m		0.5						HP	250	
							0.70m					
						SC	Extremely weathered Silty Sandstone with soil properties: breaks down into Clayey SAND - fine to medium grained, pale brown to pale orange-brown, fines of low plasticity.	M	VD			EXTREMELY WEATHERED ROCK / RESIDUAL SOIL
				1.0			1.00m					
							SILTY SANDSTONE - fine grained, pale brown-pale orange-brown and pale grey-brown, estimated low to medium strength.	D				HIGHLY WEATHERED ROCK
							Estimated Medium strength.					
							1.15m					
				1.5			Hole Terminated at 1.15 m Practical Refusal					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH06
CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE
PAGE: 1 OF 1
PROJECT: PROPOSED SPORTS AMENITIES BUILDING
JOB NO: NEW22P-0130
LOCATION: MAX MCMAHON OVAL, RUTHERFORD
LOGGED BY: BS
DATE: 14/7/22

DRILL TYPE: 2.7 TONNE EXCAVATOR
SURFACE RL:
BOREHOLE DIAMETER: 300 mm
DATUM:

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.10m				CH	FILL-TOPSOIL: Sandy CLAY - medium to high plasticity, brown and pale brown, with some dark brown, with some fine grained, sub-angular gravel, root affected to 0.1m.	M > w_P				FILL
		0.40m					0.40m					
		E 0.50m		0.5		CI	Sandy CLAY - medium plasticity, pale red-brown and pale brown, fine grained.		VSt			RESIDUAL SOIL
							0.55m					
							0.60m SANDSTONE - fine grained, brown.	D				HIGHLY WEATHERED SANDSTONE
				1.0			Hole Terminated at 0.60 m Limit Of Required Investigation					
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH07

CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE **PAGE:** 1 OF 1

PROJECT: PROPOSED SPORTS AMENITIES BUILDING **JOB NO:** NEW22P-0130

LOCATION: MAX MCMAHON OVAL, RUTHERFORD **LOGGED BY:** BB

DATE: 14/7/22

DRILL TYPE: 2.7 TONNE EXCAVATOR **SURFACE RL:**

BOREHOLE DIAMETER: 300 mm **DATUM:**

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.10m				CL	FILL-TOPSOIL: Sandy CLAY - low to medium plasticity, grey-brown to dark grey-brown, fine grained sand, root affected. Pale grey-brown to grey-brown.	M > w_P				FILL - TOPSOIL
							0.30m					
						CH	FILL: CLAY - medium to high plasticity, dark grey, trace fine grained sand.					FILL
		0.40m					0.40m					
		E 0.50m		0.5		Cl	Gravelly Sandy CLAY - medium plasticity, pale brown and pale grey-brown, fine to medium grained (mostly fine grained) sand, fine to coarse grained (mostly fine to medium grained) angular gravel.	M ~ w_P	VSt / Fb			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
							0.50m SANDY SILTSTONE - fine grained, pale brown to pale grey-brown, estimated very low strength.					HIGHLY WEATHERED ROCK
							0.60m SILTY SANDSTONE - fine grained, pale brown to pale orange-brown with some pale grey, estimated low to medium strength. Estimated medium strength.	D				
							0.70m Hole Terminated at 0.70 m Practical Refusal					
				1.0								
				1.5								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH08
CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE
PAGE: 1 OF 1
PROJECT: PROPOSED SPORTS AMENITIES BUILDING
JOB NO: NEW22P-0130
LOCATION: MAX MCMAHON OVAL, RUTHERFORD
LOGGED BY: BB
DATE: 14/7/22

DRILL TYPE: 2.7 TONNE EXCAVATOR
SURFACE RL:
BOREHOLE DIAMETER: 300 mm
DATUM:

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		E 0.10m				CL	FILL-TOPSOIL: Sandy CLAY - low to medium plasticity, grey-brown, fine to medium grained sand, trace fine to medium grained angular gravel, trace asphalt and glass.					FILL / TOPSOIL
							0.25m					
		0.30m				CI	Sandy CLAY - medium plasticity, pale grey to white, with some pale brown to pale orange-brown, fine to medium grained (mostly fine grained) sand.	M > w_P				RESIDUAL SOIL
		E 0.40m					Pale grey-white.		VSt			
				0.5						HP	300	
							0.60m					
							Hole Terminated at 0.60 m Limit Of Required Investigation					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - BOREHOLE

BOREHOLE NO: BH09

CLIENT: MAITLAND CITY COUNCIL C/ EJE ARCHITECTURE **PAGE:** 1 OF 1

PROJECT: PROPOSED SPORTS AMENITIES BUILDING **JOB NO:** NEW22P-0130

LOCATION: MAX MCMAHON OVAL, RUTHERFORD **LOGGED BY:** BB

DATE: 14/7/22

DRILL TYPE: 2.7 TONNE EXCAVATOR **SURFACE RL:**

BOREHOLE DIAMETER: 300 mm **DATUM:**

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
E		E 0.10m				SC	FILL-TOPSOIL: Clayey SAND - fine to medium grained, brown, fines of low plasticity, with some fine to medium grained rounded to sub-rounded gravel, root affected.	M				FILL / TOPSOIL
							0.30m					
		0.50m		0.5		CL	Gravelly Sandy CLAY - low to medium plasticity, pale brown to brown, fine to coarse grained sand, fine to medium grained, angular to sub-angular gravel, trace asphalt.	M > w_P				FILL
		E 0.60m										
		0.70m					0.70m					
		E 0.80m				CL	Sandy CLAY - low to medium plasticity, pale grey-brown, fine grained sand, trace fine grained angular to sub-angular gravel.	M < w_P	St / Fb			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
							0.80m Grading into Extremely Weathered rock. (Sandy Siltstone)					
							Hole Terminated at 0.80 m Limit Of Required Investigation					
				1.0								
				1.5								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample (Glass jar, sealed and chilled on site)
ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

APPENDIX E:

Data Validation Report

QA/QC DATA VALIDATION REPORT
Job No: NEW22P-0130-AA

Eurofins report: 906021-S, 906021-S-V2, 906021-AID, 906021-AID-V2, 911479-L

1. SAMPLE HANDLING

Item	Yes/No	Comments
Were the sample holding times met?	Yes	
Were the samples in proper custody between collection in the field and reaching the laboratory?	Yes	
Were the samples properly and adequately preserved?	Yes	
Were the samples received by the laboratory in good condition?	Yes	

Sampling Handling was:

Satisfactory :	✓	**Partially Satisfactory:**	**Unsatisfactory:**

2. PRECISION AND ACCURACY ASSESSMENT

Item	Yes/No	Comment
Was a NATA registered laboratory used?	Yes	-
Did the laboratory perform the requested tests?	Yes	-
Were the laboratory methods adopted NATA endorsed?	Yes	-
Were the appropriate test procedures followed?	Yes	-
Were the reporting limits satisfactory?	Yes	-
Was the NATA seal on the reports?	Yes	-
Were the reports signed by an authorised person?	Yes	-

Laboratory Precision and Accuracy was:

Satisfactory :	✓	**Partially Satisfactory:**	**Unsatisfactory:**

3. FIELD QA/QC

Soil Samples

	Samples
No. Samples Analysed	9
No. of Duplicates	1
No. of Triplicates	0
No. of Wash Blanks	0
No. of Trip Blanks	0
No. of Trip Spikes	0

No. Days Sampling

Item	Days
Number of Days Sampling	1
Number of Sampling Events	1

Field Duplicates

Item	Yes/No	Comments
Were an adequate number of field duplicates analysed?	Yes	Duplicates analysed at a rate of 1 per 9 samples.
Were RPDs within control limits? No Limit for 5-10 x EQL and 30% for >10 x EQL	Yes	-

Trip Blanks/Trip Spikes

Item	Yes/No	Comments
Were an adequate number of trip blanks and trip spikes collected?	Yes	No trip blanks or trip spikes were collected. Based on field observations (no odours or staining was observed), the absence of a trip spike does not affect the data usability.
Were the trip blanks free of contaminants? (If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals).	N/A	-
Were the trip spikes within recovery limits (between 80% and 120%)	N/A	-

Rinsate Samples

Item	Yes/No	Comments
Were an adequate number of rinsate samples used? (1 per day of using reusable sampling equipment – trowel, hand auger etc)	Yes	No rinsate samples were collected as no reusable sampling equipment was used. Samples were collected with the aid of an excavator.

Were the rinsate samples free of contaminants? (If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals).	N/A	-

4. LABORATORY INTERNAL QUALITY CONTROL PROCEDURES

A) Type of QA/QC Sample	Yes/No	Comments
Laboratory Blanks/Reagent Blanks (at least 1 per batch)	Yes	-
Laboratory Duplicates (at least 1 per batch or 1 per 10 samples)	Yes	-
Matrix Spikes, Matrix Spike Duplicates (1 for each soil type)	Yes	-
Laboratory Control Spike	Yes	-
Surrogate (where appropriate)	Yes	-

Item	Yes/No	Comments
B) Were the laboratory blanks and/or reagent blanks free of contamination?	Yes	-
C) Were the spike recoveries within control limits? **I:** *Organics/inorganics/metals (50% to 150%)* **II:** *Phenols (20% to 130%)*	Yes	-
D) Were the RPDs of the laboratory duplicates within control limits?	Yes	-
E) Were the surrogate recoveries within control limits?	Yes	-

Laboratory Internal QA/QC was:

Satisfactory :	✓	**Partially Satisfactory:**	**Unsatisfactory:**

DATA USABILITY

Item	Yes/No	Comments
Was the data directly usable?	Yes	
Was the data usable with the following corrections/modifications? (see comments)	NA	
Was the data not usable?	NA	

APPENDIX F:

Laboratory Results

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1 21 Smallwood Place Murarrie QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

V3

☐ Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Qualtest	Project №	NEW22P-0130	Project Manager	Emma Coleman	Sampler(s)	Billy Snow
Address	2 Murray Dwyer Circuit Mayfield West NSW 2304	Project Name	MCC - Rutherford	EDD Format (ESdat, EQuIS etc)	Excel	Handed over by	
Contact Name	Emma Coleman					Email for Invoice	accounts@qualtest.com.au
Phone №						Email for Results	libbybetz@qualtest.com.au billysnow@qualtest.com.au emmacoleman@qualtest.com.au stephcullen@qualtest.com.au
Special Directions							
Purchase Order							
Quote ID №	180622QUAN-3						

Analyses: Where metals are requested, please specify "Total" or "Filtered". SUITE codes must be used to attract SUITE pricing.

Required Turnaround Time (TAT) — Default will be 5 days if not ticked. ♦Surcharge will apply
- ☐ Overnight (reporting by 9am)♦
- ☐ Same day♦ ☐ 1 day♦
- ☐ 2 days♦ ☐ 3 days♦
- ☑ 5 days (Standard)
- ☐ Other( )

Containers — Change container type & size if necessary

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	Suite B7 - TRH, BTEX, PAHs, Metals	Asbestos (%w/w)	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	BH01 0.0-0.1	14/07/22	Soil	X	X							1	1	
2	BH01 0.4-0.5	14/07/22	Soil									1		
3	BH02 0.0-0.1	14/07/22	Soil	X	X							1	1	
4	BH02 0.3-0.4	14/07/22	Soil									1		
5	BH03 0.0-0.1	14/07/22	Soil	X	X							1	1	
6	BH03 0.4-0.5	14/07/22	Soil									1		
7	BH04 0.0-0.1	14/07/22	Soil	X	X							1	1	
8	BH04 0.4-0.5	14/07/22	Soil									1		
9	BH05 0.0-0.1	14/07/22	Soil	X	X							1	1	
10	BH05 0.4-0.5	14/07/22	Soil									1		
	Total Counts			5	5							10	5	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name	Billy Snow	Signature	B. Snow	Date	14.7.22	Time	1:45
Laboratory Use Only	Received By	Jaidyn Hargrove	SYD | BNE | MEL | PER | ADL | (NTL) | DRW	Signature	[signature]	Date	14/7/22	Time	2:37 pm	Temperature	7°C
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time		Report №	906621

Eurofins Environment Testing Australia Pty Ltd

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | Environment Testing Standard Terms and Conditions unless agreed otherwise. A copy is available on request.

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F 16 Mars Road Lane Cove West NSW 2066
02 9900 8400 EnviroSampleSYD@eurofins.com

☐ Brisbane Laboratory
Unit 1 21 Smallwood Place Murarrie QLD 417...
07 3902 4600 EnviroSampleBNE@eurofins.com

2/3

☐ Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Qualtest	Project №	NEW22P-0130	Project Manager	Emma Coleman
Address	2 Murray Dwyer Circuit Mayfield West NSW 2304	Project Name	MCC - Rutherford	EDD Format (ESdat, EQuIS etc)	Excel
Contact Name	Emma Coleman				
Phone №					
Special Directions					
Purchase Order					
Quote ID №	180622QUAN-3				

Sampler(s)	Billy Snow
Handed over by	
Email for Invoice	accounts@qualtest.com.au
Email for Results	libbybetz@qualtest.com.au billysnow@qualtest.com.au emmacoleman@qualtest.com.au stephcullen@qualtest.com.au

Analyses
Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.

Containers
Change container type & size if necessary

Required Turnaround Time (TAT)
Default will be 5 days if not ticked.

- ☐ Overnight (reporting by 9am)♦
- ☐ Same day♦ ☐ 1 day♦
- ☐ 2 days♦ ☐ 3 days♦
- ☑ 5 days (Standard)
- ☐ Other ( )

♦ Surcharge will apply

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	Suite B7 - TRH, BTEX, PAHs, Metals	Asbestos (%w/w)	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	BH06 0.0-0.1	14/07/22	Soil	X	X							1	1	
2	BH06 0.4-0.5	14/07/22	Soil									1		
3	BH07 0.0-0.1	14/07/22	Soil	X	X							1	1	
4	BH07 0.4-0.5	14/07/22	Soil									1		
5	BH08 0.0-0.1	14/07/22	Soil	X	X							1	1	
6	BH08 0.3-0.4	14/07/22	Soil									1		
7	BH09 0.0-0.1	14/07/22	Soil	X	X							1	1	
8	BH09 0.5-0.6	14/07/22	Soil									1	1	
9	BH09 0.7-0.8	14/07/22	Soil									1		
10	D.14.7.22	14/07/22	Soil	X								1		
			Total Counts	5	4							10	5	

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal

Name: Billy Snow Signature: [signature] Date: 14.7.22 Time: 1:45

Laboratory Use Only							
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Temperature
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Report №

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory — Unit F3 Bell F 16 Mars Road Lane Cove West NSW 2066 — 02 9900 8400 — EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory — Unit 1 21 Smallwood Place Murarrie QLD 4172 — 07 3902 4600 — EnviroSampleQLD@eurofins.com

☐ Perth Laboratory — Unit 2 31 Leach Highway Kewdale WA 6105 — 08 9251 9600 — EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory — 6 Monterey Road Dandenong South VIC 3175 — 03 8564 5000 — EnviroSampleVic@eurofins.com

3/3

Company	Qualtest	Project №	NEW22P-0130	Project Manager	Emma Coleman
Address	2 Murray Dwyer Circuit Mayfield West NSW 2304	Project Name	MCC - Rutherford	EDD Format (Excel, EQuIS etc)	Excel
Contact Name	Emma Coleman				
Phone №					
Special Directions					
Purchase Order					
Quote ID №	180622QUAN-3				

Sampler(s)	Billy Snow	
Handed over by		
Email for Invoice	accounts@qualtest.com.au	
Email for Results	libbybetz@qualtest.com.au billysnow@qualtest.com.au emmacoleman@qualtest.com.au stephcullen@qualtest.com.au	

Analyses — Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix Soil (S) Water (W)	Suite B7 - TRH, BTEX, PAHs, Metals	Asbestos (%w/w)	Containers: 500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	T.14.7.22	14/07/22	Soil									1		
2														
3														
4														
5														
6														
7														
8														
9														
10														
	Total Counts											1		

Containers — Change container type & size if necessary

Required Turnaround Time (TAT) — Default will be 5 days if not ticked. *Surcharge will apply

- ☐ Overnight (reporting by 9am)*
- ☐ Same day* ☐ 1 day*
- ☐ 2 days* ☐ 3 days*
- ☑ 5 days (Standard)
- ☐ Other( )

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name	Billy Snow	Signature		Date	14.7.22	Time	14.7.22
Laboratory Use Only	Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW		Signature		Date		Time		Temperature	
	Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW		Signature		Date		Time		Report №	

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www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	4/52 Industrial Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield East NSW 2304
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	PO Box 60 Wickham 2293
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	Tel: +61 2 4968 8448
NATA# 1261 Site# 1254	NATA# 1261 Site# 1254	NATA# 1261 Site# 18217		NATA# 1261 Site# 20794	NATA# 1261 Site# 25079

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NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Christchurch
35 O'Rorke Road	43 Detroit Drive
Penrose,	Rolleston,
Auckland 1061	Christchurch 7675
Tel: +64 9 526 45 51	Tel: 0800 856 450
IANZ# 1327	IANZ# 1290

Sample Receipt Advice

Company name:	Qualtest
Contact name:	Emma Coleman
Project name:	MCC - RUTHERFORD
Project ID:	NEW22P-0130
Turnaround time:	5 Day
Date/Time received	Jul 14, 2022 2:37 PM
Eurofins reference	906021

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Sample Jar BH05 0.4-0.5 missing.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Emma Coleman - emmacoleman@qualtest.com.au.

Note: A copy of these results will also be delivered to the general Qualtest email address.

Qualtest
2 Murray Dwyer Circuit
Mayfield West
NSW 2304

Attention:	Emma Coleman
Report	906021-AID-V2
Project Name	MCC - RUTHERFORD
Project ID	NEW22P-0130
Received Date	Jul 14, 2022
Date Reported	Aug 09, 2022

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name MCC - RUTHERFORD
Project ID NEW22P-0130
Date Sampled Jul 14, 2022
Report 906021-AID-V2

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
BH01 0.0-0.1	22-Jl0029987	Jul 14, 2022	Approximate Sample 800g Sample consisted of: Brown coarse-grained clayey sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
BH02 0.0-0.1	22-Jl0029988	Jul 14, 2022	Approximate Sample 801g Sample consisted of: Brown coarse-grained clayey sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
BH03 0.0-0.1	22-Jl0029989	Jul 14, 2022	Approximate Sample 677g Sample consisted of: Brown coarse-grained clayey sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
BH04 0.0-0.1	22-Jl0029990	Jul 14, 2022	Approximate Sample 551g Sample consisted of: Brown coarse-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
BH05 0.0-0.1	22-Jl0029991	Jul 14, 2022	Approximate Sample 765g Sample consisted of: Brown coarse-grained clayey sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
BH06 0.0-0.1	22-Jl0029992	Jul 14, 2022	Approximate Sample 749g Sample consisted of: Brown coarse-grained clayey sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
BH07 0.0-0.1	22-Jl0029993	Jul 14, 2022	Approximate Sample 717g Sample consisted of: Brown coarse-grained clayey sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
BH08 0.0-0.1	22-Jl0029994	Jul 14, 2022	Approximate Sample 611g Sample consisted of: Brown coarse-grained clayey sandy soil, bitumen and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
BH09 0.0-0.1	22-Jl0029995	Jul 14, 2022	Approximate Sample 896g Sample consisted of: Brown coarse-grained clayey sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Jul 18, 2022	Indefinite

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

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NATA# 1261 Site# 1254

Geelong
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Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

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Brisbane
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Murarrie
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Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
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Mayfield East NSW 2304
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Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

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43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Qualtest
Address: 2 Murray Dwyer Circuit
Mayfield West
NSW 2304

Project Name: MCC - RUTHERFORD
Project ID: NEW22P-0130

Order No.:
Report #: 906021
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: Jul 14, 2022 2:37 PM
Due: Jul 21, 2022
Priority: 5 Day
Contact Name: Emma Coleman

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Moisture Set	Eurofins Suite B7
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	BH01 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029987	X		X	X
2	BH02 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029988	X		X	X
3	BH03 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029989	X		X	X
4	BH04 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029990	X		X	X
5	BH05 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029991	X		X	X
6	BH06 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029992	X		X	X
7	BH07 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029993	X		X	X
8	BH08 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029994	X		X	X
9	BH09 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029995	X		X	X
10	D.14.7.22	Jul 14, 2022		Soil	N22-Jl0029996			X	X
11	BH01 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0029997		X		
12	BH02 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0029998		X		
13	BH03 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0029999		X		

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
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Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Qualtest
Address: 2 Murray Dwyer Circuit
Mayfield West
NSW 2304

Project Name: MCC - RUTHERFORD
Project ID: NEW22P-0130

Order No.:
Report #: 906021
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: Jul 14, 2022 2:37 PM
Due: Jul 21, 2022
Priority: 5 Day
Contact Name: Emma Coleman

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Moisture Set	Eurofins Suite B7
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X
14	BH04 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030000		X		
15	BH06 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030001		X		
16	BH07 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030002		X		
17	BH08 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030003		X		
18	BH09 0.5-0.6	Jul 14, 2022		Soil	N22-Jl0030004		X		
19	BH09 0.7-0.8	Jul 14, 2022		Soil	N22-Jl0030005		X		
20	T.14.7.22	Jul 14, 2022		Soil	N22-Jl0030006		X		
Test Counts						9	10	10	10

Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. Information identified on this report with the colour **orange** indicates sections of the report not covered by the laboratory's scope of NATA accreditation.
6. This report replaces any interim results previously issued.

Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).
If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (**% w/w**)
F/fld	Airborne fibre filter loading as Fibres (**N**) per Fields counted (**n**)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (**C**)
g, kg	Mass, e.g. of whole sample (**M**) or asbestos-containing find within the sample (**m**)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (**V** = **r** x **t**)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (**r**)
min	Time (**t**), e.g. of air sample collection period

Calculations

Airborne Fibre Concentration: $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{V}\right)$

Asbestos Content (as asbestos): $\%\, w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos): $\%_{WA} = \sum \frac{(m \times P_A)_x}{x}$

Terms

%asbestos	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 *Appendix 2*, else assumed to be 15% in accordance with WA DOH *Appendix 2* (**P_A**).
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
AF	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
AFM	Airborne Fibre Monitoring, e.g. by the MFM.
Amosite	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
AS	Australian Standard.
Asbestos Content (as asbestos)	Total % w/w asbestos content in asbestos-containing finds in a soil sample (**% w/w**).
Chrysotile	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
COC	Chain of Custody.
Crocidolite	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
Dry	Sample is dried by heating prior to analysis.
DS	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
FA	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
Fibre Count	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
Fibre ID	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
HSG248	UK HSE HSG248, *Asbestos: The Analysts Guide*, 2nd Edition (2021).
HSG264	UK HSE HSG264, *Asbestos: The Survey Guide* (2012).
ISO (also ISO/IEC)	International Organization for Standardization / International Electrotechnical Commission.
K Factor	Microscope constant (**K**) as derived from the effective filter area of the given AFM membrane used for collecting the sample (**A**) and the projected eyepiece graticule area of the specific microscope used for the analysis (**a**).
LOR	Limit of Reporting.
MFM (also NOHSC:3003)	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*, 2nd Edition [NOHSC:3003(2005)].
NEPM (also ASC NEPM)	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
Organic	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
PCM	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
PLM	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
SMF	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
SRA	Sample Receipt Advice.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
UK HSE HSG	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
UMF	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
WA DOH	Reference document for the NEPM. Government of Western Australia, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (updated 2021), including Appendix Four: *Laboratory analysis*
Weighted Average	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (**$\%_{WA}$**).

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Asbestos Counter/Identifier:

Sayeed Abu	Senior Analyst-Asbestos

Authorised by:

Laxman Dias	Senior Analyst-Asbestos

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

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

Qualtest
2 Murray Dwyer Circuit
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NSW 2304

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Emma Coleman**

Report **906021-S-V2**
Project name MCC - RUTHERFORD
Project ID NEW22P-0130
Received Date Jul 14, 2022

Client Sample ID			**BH01 0.0-0.1**	**BH02 0.0-0.1**	**BH03 0.0-0.1**	**BH04 0.0-0.1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N22-JI0029987**	**N22-JI0029988**	**N22-JI0029989**	**N22-JI0029990**
Date Sampled			**Jul 14, 2022**	**Jul 14, 2022**	**Jul 14, 2022**	**Jul 14, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 100	78	210
TRH C29-C36	50	mg/kg	< 50	80	78	180
TRH C10-C36 (Total)	50	mg/kg	< 50	< 100	156	520
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	135	95	94	94
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 2	< 2	< 1
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	< 2	2.1	< 1
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	2.0	2.3	1.3
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 2	< 1	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	1.0	0.9	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	1.1	1.4	0.6
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	0.7	0.7	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 2	< 2	< 1
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	1.3	1.3	0.6
Chrysene	0.5	mg/kg	< 0.5	1.2	1.4	0.6
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	0.6	2.9	3.0	1.0
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	0.7	0.9	< 0.5

Client Sample ID			BH01 0.0-0.1	BH02 0.0-0.1	BH03 0.0-0.1	BH04 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-JI0029987	N22-JI0029988	N22-JI0029989	N22-JI0029990
Date Sampled			Jul 14, 2022	Jul 14, 2022	Jul 14, 2022	Jul 14, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 2	0.8	< 0.5
Pyrene	0.5	mg/kg	< 0.5	1.7	1.5	0.5
Total PAH*	0.5	mg/kg	0.6	11	12	3.3
2-Fluorobiphenyl (surr.)	1	%	129	113	[Q09]INT	139
p-Terphenyl-d14 (surr.)	1	%	65	65	60	91
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 200	130	310
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	140
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 200	130	590
Heavy Metals						
Arsenic	2	mg/kg	5.6	2.8	6.9	4.1
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	19	12	19	11
Copper	5	mg/kg	< 5	7.3	9.6	18
Lead	5	mg/kg	14	8.5	14	13
Mercury	0.1	mg/kg	< 0.1	< 0.1	2.4	< 0.1
Nickel	5	mg/kg	5.9	10.0	14	7.9
Zinc	5	mg/kg	21	87	140	79
% Moisture	1	%	11	16	22	24

Client Sample ID			BH05 0.0-0.1	BH06 0.0-0.1	BH07 0.0-0.1	BH08 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-JI0029991	N22-JI0029992	N22-JI0029993	N22-JI0029994
Date Sampled			Jul 14, 2022	Jul 14, 2022	Jul 14, 2022	Jul 14, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 100	< 50	150
TRH C29-C36	50	mg/kg	< 50	62	< 50	140
TRH C10-C36 (Total)	50	mg/kg	< 50	< 100	< 50	290
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	121	102	104	111
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20

Client Sample ID			BH05 0.0-0.1	BH06 0.0-0.1	BH07 0.0-0.1	BH08 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-JI0029991	N22-JI0029992	N22-JI0029993	N22-JI0029994
Date Sampled			Jul 14, 2022	Jul 14, 2022	Jul 14, 2022	Jul 14, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.4
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	1.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.9
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.1
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	0.5	0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.7
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.0
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.0
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	0.6	1.6
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.0
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.3
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	1.1	9.5
2-Fluorobiphenyl (surr.)	1	%	143	127	115	105
p-Terphenyl-d14 (surr.)	1	%	125	85	94	79
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	100	< 100	240
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	120
TRH >C10-C40 (total)*	100	mg/kg	< 100	100	< 100	360
Heavy Metals						
Arsenic	2	mg/kg	13	5.0	8.1	5.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	31	21	26	37
Copper	5	mg/kg	< 5	9.8	13	18
Lead	5	mg/kg	12	11	15	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	5.6	14	16	27
Zinc	5	mg/kg	37	97	75	70
% Moisture	1	%	18	23	32	26

Client Sample ID			BH09 0.0-0.1	D.14.7.22
Sample Matrix			Soil	Soil
Eurofins Sample No.			N22-JI0029995	N22-JI0029996
Date Sampled			Jul 14, 2022	Jul 14, 2022
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20
TRH C15-C28	50	mg/kg	73	< 100
TRH C29-C36	50	mg/kg	92	60
TRH C10-C36 (Total)	50	mg/kg	165	< 100
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	70	104
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	1.7	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.9	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	2.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	1.3	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	0.6	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	1.0	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	1.1	< 0.5
Chrysene	0.5	mg/kg	0.9	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	1.9	0.6
Fluorene	0.5	mg/kg	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	1.1	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	0.6	< 0.5
Pyrene	0.5	mg/kg	1.6	< 1
Total PAH*	0.5	mg/kg	11	< 1
2-Fluorobiphenyl (surr.)	1	%	93	122
p-Terphenyl-d14 (surr.)	1	%	86	73
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	130	< 200
TRH >C34-C40	100	mg/kg	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	130	< 200

Client Sample ID			BH09 0.0-0.1	D.14.7.22
Sample Matrix			Soil	Soil
Eurofins Sample No.			N22-JI0029995	N22-JI0029996
Date Sampled			Jul 14, 2022	Jul 14, 2022
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	2	mg/kg	6.6	6.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	37	22
Copper	5	mg/kg	8.7	< 5
Lead	5	mg/kg	9.8	18
Mercury	0.1	mg/kg	< 0.1	< 0.1
Nickel	5	mg/kg	15	9.7
Zinc	5	mg/kg	39	29
% Moisture	1	%	15	12

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Aug 08, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Jul 21, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 21, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Aug 08, 2022	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Aug 08, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Sydney	Jul 21, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jul 15, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			

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IANZ# 1290

Company Name: Qualtest
Address: 2 Murray Dwyer Circuit
Mayfield West
NSW 2304

Project Name: MCC - RUTHERFORD
Project ID: NEW22P-0130

Order No.:
Report #: 906021
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: Jul 14, 2022 2:37 PM
Due: Jul 21, 2022
Priority: 5 Day
Contact Name: Emma Coleman

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Moisture Set	Eurofins Suite B7
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	BH01 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029987	X		X	X
2	BH02 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029988	X		X	X
3	BH03 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029989	X		X	X
4	BH04 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029990	X		X	X
5	BH05 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029991	X		X	X
6	BH06 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029992	X		X	X
7	BH07 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029993	X		X	X
8	BH08 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029994	X		X	X
9	BH09 0.0-0.1	Jul 14, 2022		Soil	N22-Jl0029995	X		X	X
10	D.14.7.22	Jul 14, 2022		Soil	N22-Jl0029996			X	X
11	BH01 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0029997		X		
12	BH02 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0029998		X		
13	BH03 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0029999		X		

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IANZ# 1290

Company Name: Qualtest
Address: 2 Murray Dwyer Circuit
Mayfield West
NSW 2304

Project Name: MCC - RUTHERFORD
Project ID: NEW22P-0130

Order No.:
Report #: 906021
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: Jul 14, 2022 2:37 PM
Due: Jul 21, 2022
Priority: 5 Day
Contact Name: Emma Coleman

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Moisture Set	Eurofins Suite B7
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X
14	BH04 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030000		X		
15	BH06 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030001		X		
16	BH07 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030002		X		
17	BH08 0.4-0.5	Jul 14, 2022		Soil	N22-Jl0030003		X		
18	BH09 0.5-0.6	Jul 14, 2022		Soil	N22-Jl0030004		X		
19	BH09 0.7-0.8	Jul 14, 2022		Soil	N22-Jl0030005		X		
20	T.14.7.22	Jul 14, 2022		Soil	N22-Jl0030006		X		
Test Counts						9	10	10	10

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Total PAH*	mg/kg	-			0.5	N/A	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	85			70-130	Pass	
TRH C10-C14	%	98			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	86			70-130	Pass	
Toluene	%	88			70-130	Pass	
Ethylbenzene	%	90			70-130	Pass	
m&p-Xylenes	%	85			70-130	Pass	
o-Xylene	%	91			70-130	Pass	
Xylenes - Total*	%	87			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	92			70-130	Pass	
TRH C6-C10	%	81			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	88			70-130	Pass	
Acenaphthylene	%	74			70-130	Pass	
Anthracene	%	130			70-130	Pass	
Benz(a)anthracene	%	93			70-130	Pass	
Benzo(a)pyrene	%	92			70-130	Pass	
Benzo(b&j)fluoranthene	%	79			70-130	Pass	
Benzo(g.h.i)perylene	%	120			70-130	Pass	
Benzo(k)fluoranthene	%	102			70-130	Pass	
Chrysene	%	78			70-130	Pass	
Dibenz(a.h)anthracene	%	79			70-130	Pass	
Fluoranthene	%	100			70-130	Pass	
Fluorene	%	109			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	78			70-130	Pass	
Naphthalene	%	80			70-130	Pass	
Phenanthrene	%	87			70-130	Pass	
Pyrene	%	83			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	95			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	98			80-120	Pass	
Cadmium	%	99			80-120	Pass	
Chromium	%	100			80-120	Pass	
Copper	%	99			80-120	Pass	
Lead	%	100			80-120	Pass	
Mercury	%	88			80-120	Pass	
Nickel	%	101			80-120	Pass	
Zinc	%	96			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S22-Jl0035301	NCP	%	115			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S22-Jl0035301	NCP	%	103			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Toluene	S22-Jl0035301	NCP	%	109			70-130	Pass	
Ethylbenzene	S22-Jl0035301	NCP	%	113			70-130	Pass	
m&p-Xylenes	S22-Jl0035301	NCP	%	113			70-130	Pass	
o-Xylene	S22-Jl0035301	NCP	%	113			70-130	Pass	
Xylenes - Total*	S22-Jl0035301	NCP	%	113			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S22-Jl0035301	NCP	%	99			70-130	Pass	
TRH C6-C10	S22-Jl0035301	NCP	%	113			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S22-Jn0066558	NCP	%	98			75-125	Pass	
Cadmium	S22-Jl0038446	NCP	%	114			75-125	Pass	
Chromium	S22-Jl0038446	NCP	%	117			75-125	Pass	
Copper	S22-Jl0038446	NCP	%	108			75-125	Pass	
Lead	S22-Jl0038446	NCP	%	117			75-125	Pass	
Mercury	S22-Jn0066558	NCP	%	110			75-125	Pass	
Nickel	S22-Jl0038446	NCP	%	115			75-125	Pass	
Zinc	S22-Jl0038446	NCP	%	93			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	N22-Jl0029994	CP	%	83			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	N22-Jl0029994	CP	%	80			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S22-Jl0035298	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S22-Jl0035298	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S22-Jl0035298	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S22-Jl0035298	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S22-Jl0035298	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S22-Jl0035298	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S22-Jl0035298	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S22-Jl0035298	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S22-Jl0035298	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Fluorene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S22-Jl0029776	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	N22-Jl0029991	CP	%	18	18	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	N22-Jl0029993	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	N22-Jl0029993	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	N22-Jl0029993	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	N22-Jl0029993	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	N22-Jl0029993	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	N22-Jl0029993	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	N22-Jl0029993	CP	mg/kg	8.1	8.8	9.0	30%	Pass	
Cadmium	N22-Jl0029993	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	N22-Jl0029993	CP	mg/kg	26	31	17	30%	Pass	
Copper	N22-Jl0029993	CP	mg/kg	13	15	8.0	30%	Pass	
Lead	N22-Jl0029993	CP	mg/kg	15	18	16	30%	Pass	
Mercury	N22-Jl0029993	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	N22-Jl0029993	CP	mg/kg	16	18	11	30%	Pass	
Zinc	N22-Jl0029993	CP	mg/kg	75	83	10	30%	Pass	

Comments

V2- new version with repeated PAHs on JI002994 and 995 as per client request.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q09	The Surrogate recovery is outside of the recommended acceptance criteria due to matrix interference. Acceptance criteria were met for all other QC

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Organic
Gabriele Cordero	Senior Analyst-Metal
Laxman Dias	Senior Analyst-Asbestos
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

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

3 DAY TAT ADDITIONAL LEACHATE: FW: Eurofins Test Results, Invoice - Report 906021 : Site MCC - RUTHERFORD (NEW22P-0130)

Andrew Black <AndrewBlack@eurofins.com>

Tue 2022-08-02 9:18 AM

To: #AU04_Enviro_Sample_NSW <EnviroSampleNSW@eurofins.com>

Urgent 3 day TAT additional leachate thanks team

Andrew Black
Analytical Services Manager

Eurofins | Environment Testing Australia Pty Ltd
Unit 7
7 Friesian Close
SANDGATE, NSW, 2304
AUSTRALIA
Phone: +61 2 9900 8490
Mobile: +61 410 220 750
Email: AndrewBlack@eurofins.com
Website: eurofins.com.au/environmental-testing

For sample receipt enquiries (eg. SRAs, changes to analysis) please contact EnvirosampleNSW@eurofins.com or 02 9900 8421 (7am – 9pm).
For despatch enquiries (eg. courier bookings, bottle orders) please contact AU04_Despatch_SYD@eurofins.com or 0488 400 929 (8am – 4pm).

From: Billy Snow <BillySnow@qualtest.com.au>
Sent: Tuesday, 2 August 2022 8:46 AM
To: Andrew Black <AndrewBlack@eurofins.com>
Cc: Emma Coleman <EmmaColeman@qualtest.com.au>
Subject: RE: Eurofins Test Results, Invoice - Report 906021 : Site MCC - RUTHERFORD (NEW22P-0130)

Hi Andrew,

Could I please order a Benzo (a) pyrene TCLP test for the above job, on the following sample:

Sample ID - BH09 0.0-0.1

Kind Regards,

Billy Snow
Environmental Scientist

Mob: 0432 563 250
Tel: 02 4968 4468
Web: www.qualtest.com.au
2 Murray Dwyer Circuit, Mayfield West, NSW, 2304
Billysnow@qualtest.com.au

From: AndrewBlack@eurofins.com <AndrewBlack@eurofins.com>
Sent: Monday, 25 July 2022 4:16 PM
To: Emma Coleman <EmmaColeman@qualtest.com.au>
Cc: Amanda Neale <amandaneale@qualtest.com.au>; Billy Snow <BillySnow@qualtest.com.au>; Libby Betz <LibbyBetz@qualtest.com.au>; Stephanie Cullen <stephcullen@qualtest.com.au>
Subject: Eurofins Test Results, Invoice - Report 906021 : Site MCC - RUTHERFORD (NEW22P-0130)

Kindest Regards,

Andrew Black
Analytical Services Manager

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Eurofins Environment Testing Australia Pty Ltd

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NATA# 1261 Site# 1254	NATA# 1261 Site# 1254	NATA# 1261 Site# 18217		NATA# 1261 Site# 20794	NATA# 1261 Site# 25079

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IANZ# 1327	IANZ# 1290

Sample Receipt Advice

Company name:	Qualtest
Contact name:	Emma Coleman
Project name:	ADDITIONAL - MCC RUTHERFORD
Project ID:	ADDITIONAL - NEW22P-0130
Turnaround time:	3 Day
Date/Time received	Aug 2, 2022 9:18 AM
Eurofins reference	911479

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Emma Coleman - emmacoleman@qualtest.com.au.

Note: A copy of these results will also be delivered to the general Qualtest email address.

Qualtest
2 Murray Dwyer Circuit
Mayfield West
NSW 2304

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Emma Coleman**

Report **911479-L**
Project name ADDITIONAL - MCC RUTHERFORD
Project ID ADDITIONAL - NEW22P-0130
Received Date Aug 02, 2022

Client Sample ID			**BH09 0.0-0.1**
Sample Matrix			**US Leachate**
Eurofins Sample No.			**S22-Au0009715**
Date Sampled			**Jul 14, 2022**
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene	0.001	mg/L	< 0.001
USA Leaching Procedure			
Leachate Fluid[C01]		comment	1.0
pH (initial)	0.1	pH Units	6.9
pH (off)	0.1	pH Units	5.1
pH (USA HCl addition)	0.1	pH Units	0.9

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Sydney	Aug 04, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
USA Leaching Procedure	Sydney	Aug 04, 2022	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins

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Company Name: Qualtest
Address: 2 Murray Dwyer Circuit
Mayfield West
NSW 2304

Project Name: ADDITIONAL - MCC RUTHERFORD
Project ID: ADDITIONAL - NEW22P-0130

Order No.:
Report #: 911479
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: Aug 2, 2022 9:18 AM
Due: Aug 5, 2022
Priority: 3 Day
Contact Name: Emma Coleman

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Benzo(a)pyrene	USA Leaching Procedure
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	BH09 0.0-0.1	Jul 14, 2022		US Leachate	S22-Au0009715	X	X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Robert Biviano	Analytical Services Manager
Roopesh Rangarajan	Senior Analyst-Organic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

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