Preliminary & Detailed Contamination Assessment

252 Coal Road, Muswellbrook, NSW.

NEW22P-0092-AA
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Qualtest
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Executive Summary

Qualtest Laboratory NSW Pty Ltd (Qualtest) has carried out a Preliminary & Detailed Contamination Assessment (CA) for Muswellbrook Shire Council (Council) for the site located at 252 Coal Road, Muswellbrook NSW (the Site). The site location is shown on Figure 1, Appendix A.

The site is approximately 2.6ha in area, and comprises part Lot 1 DP819014 as shown on Figure 2, Appendix A. It is understood that Council proposes to construct a Community Infrastructure Depot, which will comprise industrial sheds, with associated hardstand and car parking.

The objectives of the CA were to provide:

- An assessment of the likelihood for contamination to be present on the site from past uses and activities;
- Assess the location and extent of soil contamination (if any); 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:

- Desktop study and site history review;
- Site walkover;
- Collection of soil samples from nine borehole locations;
- Collection of soil samples from nine surface soil locations;
- Laboratory analysis of soil samples for identified contaminants of concern; and,
- Data assessment and preparation of a Preliminary & Detailed Contamination Assessment Report.

The site history review showed that the site was crown land until 1993 when Muswellbrook Shire Council obtained the site. Council constructed a Waste and Recycling facility adjacent to the north east of the site in 1993. Landfilling activities associated with the Waste and Recycling facility are carried out offsite to the north east. Anecdotal information suggests that prior to the site being owned by Council the site was utilised as an open cut coal mine by Muswellbrook Coal Company. Available information indicates that [prior to Muswellbrook Coal Company utilising the land, the site was an undeveloped greenfield site.

Some disturbed land and possible filling was observed across the site dating back to 1958. A potential rail line was also present running in an east west direction through the central and southern portion of the site, likely associated with former coal mining located to the north east of the site. The former railway line appeared to be removed and replaced with a swale drain in the early 1990s. From the early 1990's to the present day the site has been generally vacant vegetated land used for the storage of unknown materials and equipment. During the site walkover large areas of filling and stockpiles were observed across the site. Anecdotal information suggests that the filling and stockpiles was likely mining overburden produced by Muswellbrook Coal Company.

Five Areas of Environmental Concern (AECs) were identified based on the site history and site observations. The AECs related to: 1. Imported Fill (placed and stockpiled); 2. Current and former buildings across the site; 3. Storage of unknown materials/objects and equipment; 4. Former mining works and potential infrastructure; 5. Landfilling works to the north east of the site.

Sampling and analysis targeted the AECs identified within the proposed development area (excluding AEC 5 groundwater and ground gases), with a targeted soil sampling pattern adopted. The soil laboratory results reported concentrations of contaminants below the adopted human health and ecological criteria.

The Conceptual Site Model did not identify complete exposure pathways for human or ecological receptors for AEC 1 to AEC4. A 'likely' incomplete exposure pathway for current and future construction site users was identified for AEC 5 - Landfilling works to the north east of the site. The 'likely' incomplete exposure pathway was identified based on depth to groundwater and results of groundwater and gas monitoring carried out by CBased Environmental Pty Ltd. However it is noted that no information was provided on the location, monitoring depths and methodologies for the methane gas monitoring. Additional information on sampling locations, depth and methodology will be required to confirm an incomplete exposure pathway for ground gases.

Based on the results of the Preliminary and Detailed Contamination Assessment it is considered the site can be made suitable for the proposed commercial/industrial development, with the following recommendations:

- Assessment of additional information on gas sampling locations, depths and methodologies to confirm the gas sampling results are representative of ground gases in the vicinity of the proposed development. If this information can not be obtained, a gas monitoring assessment is recommended in the area of proposed development; and
- Preparation of a Construction Environmental Plan (CEMP) which will include an Unexpected Finds Procedure (UFP). The CEMP will be implemented during vegetation clearing and earthworks.

Provided the recommendations made within this report are implemented, it is considered that the site could be rendered suitable, from a contamination point of view, for the proposed commercial/industrial development.

It is noted that should any soils require offsite disposal, they will require waste classification in accordance with the NSW EPA (2014) Waste Classification Guidelines.

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). This report comprises a Stage 1 and Stage 2 contamination assessment, as described by State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 4.

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Attachments:

1.0 Introduction

Qualtest Laboratory NSW Pty Ltd (Qualtest) has carried out a Preliminary & Detailed Contamination Assessment (CA) for Muswellbrook Shire Council (Council) for the site located at 252 Coal Road, Muswellbrook NSW (the Site). The site location is shown on Figure 1, Appendix A.

The site is approximately 2.6ha in area, and comprises part Lot 1 DP819014 as shown on Figure 2, Appendix A. It is understood that Council proposes to construct a Community Infrastructure Depot, which will comprise industrial sheds, with associated hardstand and car parking.

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). This report comprises a Stage 1 and Stage 2 contamination assessment, as described by State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 4.

1.1 Objectives

The objectives of the CA were to provide:

- An assessment of the likelihood for contamination to be present on the site from past uses and activities;
- Assess the location and extent of soil contamination (if any); and,
- Provide recommendations on the need for further assessment, management and/or remediation (if required).

1.2 Scope of Works

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

- Desktop study and site history review;
- Site walkover;
- Collection of soil samples from nine borehole locations;
- Collection of soil samples from nine surface soil locations;
- Laboratory analysis of soil samples for identified contaminants of concern; and,
- Data assessment and preparation of a Preliminary & Detailed Contamination Assessment 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, and the layout of the lots is shown on Figure 2, Appendix A.

Table 2.1: Summary of Property and Site Details

Property Address:	252 Coal Road, Muswellbrook, NSW
Approximate property and site area and dimensions:	Approximately 2.6ha. About 240m long by 240m wide at its widest and longest points.
Title Identification Details:	Part Lot 1 DP819014 within the Muswellbrook Shire Council local government area, Parish of Rowan, County of Durham.
Current Zoning	SP2 – Infrastructure.
Current Ownership:	Muswellbrook Shire Council.
Previous and Current Landuse:	Formerly land surrounding an open cut coal mine. Currently vacant vegetated land adjacent to a waste facility.
Proposed Landuse:	Proposed commercial/industrial development.
Adjoining Site Uses:	North – Vacant land; South – Coal Road followed by vacant land; East – Muswellbrook Waste & Recycling Facility; and West – Dense bushland followed by vacant land and Weeraman sport fields.
Site Coordinates for approx. centre of site:	32°15'33.46 S 150°54'47.03 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 ranged between about 215m AHD in the northern portion of the site to about 225m in the south-eastern portions of the site.

The highest area of the site was observed in the south-eastern portion of the site. The general surface topography was observed to slope down to the west.

Rain falling on the site would be expected to infiltrate into the site surface. Excess surface water is expected to follow the site topography, and flow west into an off-site dam located along the western boundary of the site. Excess surface water is then expected to flow west into an unnamed creek located approximately 300m west of the site.

2.3 Regional Geology

Reference to the 1:100,000 Hunter Coalfields Regional Geology map indicates the site is underlain by the Rowan Formation of the Greta Coal Measures, which are characterised by coal seams, sandstone, and siltstone rock types.

2.4 Hydrogeology

Groundwater beneath the site is anticipated to be present in a semi-confined aquifer in residual soils and weathered rock at depths greater than 15m below ground surface (bgs). Groundwater flow direction is anticipated to follow the surface topography and flow west towards an unnamed creek located approximately 300m west of the site and eventually discharging into the Hunter River located approximately 2.2km west 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 no registered bores within this radius. A copy of the search is provided in Appendix B.

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 Site History Review

A site history review was undertaken as part of the Preliminary CA, and included:

- A review of historical ownership of the site (Lot 1 DP 819014);
- A review of historical aerial photography from the past 64 years (excluding the 60s);
- A review of Section 10.7 Certificates for Lot 1 DP819014 from Council;
- Interview with people familiar with the site;
- Search of the NSW EPA's public register of contaminated sites; and
- A site walkover to help identify current and previous activities carried out on the site, identify surrounding land uses, and assess Areas of Environmental Concern (AECs) and Chemicals of Potential Concern (COPCs).

The information provided from the above reviews is summarised in the sections below.

3.1 Historical Titles Search

A search of historical titles for Lot 1 DP819014 was undertaken by Advanced Legal Searchers Pty Ltd. A list of past registered proprietors dating back to 1993 was obtained. The results of the search are included in Appendix C and a summary is presented below in Table 3.1.

Table 3.1: Summary of Historical Titles

Lot 1 DP 819014	
Date	**Owner**
1993 – To date	The Council of the Shire of Muswellbrook
Prior – 1993	Crown Land

The historical title search indicated that the site has been owned by Muswellbrook Shire Council from 1993 to date. Prior to 1993 the site was Crown Land.

3.2 Aerial Photograph Review

Aerial photographs of the site from 1958, 1974, 1989 and 1998 were obtained from the NSW Government Spatial Portal (https://portal.spatial.nsw.gov.au/), and satellite images from Google Earth for 2009 and 2021, were assessed by a Qualtest Environmental Scientist. No aerial photograph from the 1960s was available.

A description of the aerial photograph are summarised below in Table 3.2. The aerial photographs are presented in Appendix D.

Table 3.2: Aerial Photograph Review

Year	Site	Surrounding Land
1958	Land disturbance appears across most of the site. A potential rail line is present running in an east west direction through the southern portion of the site. Scattered trees can also be observed in the southern portion.	The surrounding land appears to be mostly disturbed, vacant land. Most likely utilised for farming and coal mining. Scattered trees appear to the south. An opencut coalmine can be observed to the north-east. A small number of sheds/ buildings are present to the north-east and south-west of the site. A residential development can also be observed to the south-west.
1974	Additional land disturbance appears to be present in the northern portion of the site. Additional vegetation appears to be present in the eastern portion. The remaining site area appears relatively unchanged from the 1958 aerial photograph.	Land disturbance to the north-east and west has increased. The coal mine to the north-east appears to have been expanded. A building present directly to the north-east of the site appears to have been removed and additional buildings constructed further to the north-east. The remaining surrounding land appears similar to the 1958 aerial photograph.
1989	A gravel road can be observed running through the southern portion of the site in the location of the former rail line. Some unpaved access tracks can be observed across the remainder of the site. The remainder of the site appears to be vacant grassland with scattered trees.	The disturbed land to the north appears to be vacant land with grass and vegetation. The sheds/buildings to the north east appear to have been removed. The remaining surrounding land appears similar to the 1974 aerial photograph.

Year	Site	Surrounding Land
1998	Filling and land disturbance can be observed in the northern portion of the site. The former gravel roadway alignment appears to have changed/been removed and now two access roads appear to run approximately east to west in the vicinity of the former road. Storage of unknown material can be observed in the south-eastern portion. The site is mostly cleared of vegetation. Scattered trees can be observed in the south and south-eastern portions.	The council landfill has been developed to the immediate north-east of the site. The area to the north and west appears to have been stripped of topsoil. Two dams have been constructed along the western boundary of the site. Coal Road has been constructed along the southern boundary of the site. A large shed/building has been constructed to the east of the south eastern boundary.
2009	Vegetation density has increased. Unknown material/objects and equipment appear to be stored across the southern portion. A small shed/structure appears to have been constructed in the central southern portion. The remaining site appears relatively similar to the 1998 aerial photograph.	Vegetation density has increased, particularly to the north and west. The building located to the east of the eastern boundary appears to have been expanded. The mine to the north-east appears to have been filled. The disturbed area to the west appears to have been developed into sporting fields.
2021	The unknown material/ objects and the structure observed in the southern and eastern portions appear to have been removed. The remaining site appears relatively unchanged from the 2009 aerial photograph.	The building to the east has again been expanded and the roof colour has changed. The mine to the north-east appears to have been filled and covered with vegetation. The remaining surrounding land appears relatively similar to the 2009 aerial photograph.

3.3 Site Observations

A Qualtest Environmental Scientist visited the site on 18 May 2022. Selected site photographs are presented in Appendix E. The location of site features is shown on Figure 3, Appendix A. A summary of the site features is outlined below:

- The majority of the site was observed to be vegetated with thick grass with some small to large sized trees observed scattered across the site (see Photographs 1 to 3);
- Two access roads were observed in the southern portion of the site, running approximately east-west and one access road was observed in the northern portion of the site running north-south. The access roads were observed to be constructed of a sandy gravel roadbase

material. Some asphalt was also observed in areas of the access roads (see Photographs 4 and 5);

- Several stockpiles and areas of filling were observed across the site and comprised the following (see Photograph 6 to 10):
    - SP1 - Approximately 23,000m^3, comprising silty clayey gravel, brown, observed along the southern boundary.
    - SP2 – Approximately 10m^3, comprising gravelly clay, with some sand, brown to orange-brown, observed in the central-southern portion of the site.
    - SP3 – Approximately 8m^3, comprising gravelly clay, with some sand, brown and dark brown with some orange brown, observed in the central-southern portion of the site.
    - Filling Area 1 – Approximately 1,200m^2 comprising sandy gravel, grey to dark grey with brown and trace black, observed in the south-western portion of the site.
    - Filling Area 2 – Approximately 750m^2, comprising sandy gravel, coal chitter and siltstone, medium to cobble sized, dark grey-brown to brown and some black, observed in the northern portion of the site.
    - Filling Area 3 – Approximately 830m^2, comprising sandy clay and gravelly clay, brown with some pale brown to pale orange, observed in the northern portion of the site.

  The material observed within the stockpiles was observed to be consistent with the natural site soils on the site/surrounding area and likely overburden from former mining activities carried out on/adjacent to the site.
- A power line easement was observed running north south along the western boundary of the site (see Photograph 10);
- A swale drain was observed to be running along the northern boundary of the southern portion of the site (in the vicinity of the former railway). The swale drain was observed to run to a concrete culvert then west off the site (See Photograph 11);
- Some concrete rubble and general rubbish such as plastic, cans etc was observed to be scattered across the southern portion of the site (see Photograph 12);
- A thin surface layer of concrete rubble was observed in the southern portion of the site. The concrete rubble area was approximately 80m^2 and appeared to be used as a hard stand for vehicles moving between the two access tracks in the southern portion of the site (see Photograph 13) and;
- Muswellbrook Waste and Recycling Facility was observed to the immediate east of the site (see Photographs 14 and 15).

3.4 NSW EPA Records & Environment Protection Licenses

Contaminated Land Records

A search of the NSW EPA database of notices issued under the Contaminated Land Management Act, 1997 (CLM Act) revealed there were no properties listed as having current and/or former notices within the Muswellbrook suburb.

A search of sites that have been notified to NSW EPA as contaminated (as of 6 May 2022) was also carried out. The search identified 12 properties within the Muswellbrook suburb which had been notified to the NSW EPA as being contaminated. These properties were:

- Former Caltex Depot, 1 Lower William Street, Muswellbrook. Approximately 2.5km west of the site (Regulation under the CLM Act not required);
- Vacant Rail Land, 27 Brook Street, Muswellbrook. Approximately 2.5km west of the site (Regulation under the CLM Act not required);
- Former Mobile Service Station, 49-51 Maitland Street, Muswellbrook. Approximately 2.6km south-west of the site (Regulation under the CLM Act not required);

- Former Mobile Service Station, 43-51 Ford Street, Muswellbrook. Approximately 2.35km west of the site (Regulation under the CLM Act not required);
- Woolworths Petrol, 72 Brook Street, Muswellbrook. Approximately 2.2km west of the site (Regulation under the CLM Act not required);
- Caltex Muswellbrook Service Station, 84-86 Maitland Street, Muswellbrook. Approximately 2.5km south-west of the site (Regulation under the CLM Act not required);
- Former Gasworks, Corner Carl Street and Foley Street, Muswellbrook. Approximately 2.1km south-west of the site (Regulation under the CLM Act not required);
- Bayswater Power Station, New England Highway, Muswellbrook. > 10km south of the site (Regulation under the CLM Act not required);
- Former Industrial Site, lot 89 Rathmore Street, Muswellbrook. Using co-ordinates provided, the site was on Strathmore Road, about 6km south-west of the site (Regulation under the CLM Act not required);
- Caltex Service Station, 12-16 Sydney Street, Muswellbrook. Approximately 2.6km west to south-west of the site (Regulation under the CLM Act not required);
- Former Caltex Depot, 47-50 Victoria Street, Muswellbrook. Approximately 2.2km south-west of the site (Regulation under the CLM Act not required); and,
- Former Pit Top No. 1 Colliery, Corner Clendinning Street and Victoria Street, Muswellbrook. Approximately 1.9km south-west of the site (Regulation under the CLM Act not required).

A copy of the above searches is provided in Appendix F.

Based on the distance and direction from the site (down gradient), contamination from the above properties (if any) are not considered to impact the site.

Penalty Notices

The Protection of the Environment Operations (POEO) register under Section 308 of the POEO Act 1997, was searched for Penalty Notices for the suburb of Muswellbrook, NSW. The search revealed 225 Penalty Notices (current and former). One property with Penalty Notices was located within 500m of the site:

- Muswellbrook Waste & recycle Facility (PN 1003017, 1010477, 1027776, 1047692, 1069214, 1095168, 1098514, 1119470, 1534225) 252 Coal Road, Muswellbrook, located on and immediately to the north east of the site. All notices relate to: "License variations" of license No. 5980.

Potential contamination migrating from Muswellbrook Waste & Recycle Facility, is discussed further in Section 3.7, below.

Environment Protection Licenses (EPLs)

The Protection of the Environment Operations (POEO) register under Section 308 of the POEO Act 1997, was searched for Environment Protection Licenses (EPLs) and notices for the suburb of Muswellbrook NSW. The search revealed there were 19 properties within the Muswellbrook suburb with an EPL. One property with an EPL was located within 500m of the site:

Company Name	Address	Approx. Distance & Direction from Site	Licensed Activity
Muswellbrook Shire Council	252 Coal Road, Muswellbrook	Located on and to the north east of the site.	Waste Storage

Potential contamination migrating from Muswellbrook Waste & Recycle Facility, is discussed further in Section 3.7, below.

A copy of the above searches is provided in Appendix F.

NSW EPA PFAS Investigation Program

Based on a review of the NSW EPA Government PFAS Investigation Program (ref: https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program), there are no properties in the suburb of Muswellbrook that have been identified as a site that is likely to have used large quantities of PFAS.

NSW EPA Former Gasworks Sites

Based on a review of the NSW EPA website (ref: https://www.epa.nsw.gov.au/your-environment/contaminated-land/other-contamination-issues/former-gasworks-sites), One former gasworks has been identified in the suburb of Muswellbrook. The former gas works was located on Carl Street, Muswellbrook. Given the distance from the former gas works to the site, approx. 2km, it is considered that there is a low potential that contamination from the former gas works could impact the site.

A copy of the above searches is provided in Appendix F.

3.5 Anecdotal Information

A phone interview was held with a Ms Joann Polson on 3 June 2022. Ms Polson is the Manager of Waste Operations for the Muswellbrook Waste and Recycling Facility. Ms Polson provided information on the site back to the mid-1980s. Information obtained from Ms Polson is summarised below:

- The site was previously owned by Muswellbrook Coal Company in the 1980s and operated as an open cut coal pit. Approximately 2000 tonnes of coal was removed from the open cut coal mine.
- Prior to Muswellbrook Coal Company mining the land, Ms Polson understood the site to be a greenfield site.
- Ms Polson said that much of the fill material on the site was coal mining overburden.
- Ms Polson was unsure of the origins of the large stockpile which is located along the southern boundary of the site. Ms Polson said that plans she has, identified the stockpile as a "visual bund, clay stockpile". Ms Polson also thought that it is possible that the origin of the stockpile may have been overburden material from the former open cut coal mine.
- Prior to Muswellbrook Coal Company handing over the site to Council, many trees were planted.
- Ms Polson is not aware of any chemicals such as pesticides, herbicides etc being used on the site. Ms Polson said the team of workers at the facility are mostly focused on maintaining areas to the east of the site where most of the facilities activities occur.
- Groundwater wells have been installed in the northern portion of the site. Some fill may be present around the wells comprising of drill cuttings from the boreholes.
- When it rains large amounts of water flows from Coal Road, down from the south-eastern portion of the site into a swale drain along the fence boundary which separates the site and the landfill pit. The water then runs west.
- A while ago there was some material imported to the site to access the high voltage power lines. Ms Polson said that she wasn't sure who imported it. The material may have been imported by Ausgrid but that could not be confirmed.

3.6 Section 10.7 Certificate

A Section 10.7 Certificate for the site was obtained from Muswellbrook Shire Council, and is presented in Appendix G.

In relation to contaminated land, the Section 10.7 Certificate states that:

The land is affected by a policy adopted by the council, or adopted by any other public authority that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding). Muswellbrook DCP 2009 contains requirements for new development to consider the issues of potentially contaminated land, and land use buffers to premises that may emit odours.

3.7 Previous Reports

GHD Pty Ltd (2017) - Muswellbrook Waste and Recycling Facility, Groundwater Monitoring Plan, dated April 2017

Council engaged GHD Pty Ltd (GHD) to prepare a Groundwater Monitoring Plan for the Council operated waste and recycling facility, located on and adjacent to the site.

The purpose of the Groundwater Monitoring Plan (GMP) was to "*review the hydrogeological environment and the existing groundwater monitoring network at the site and provide recommendations to Council to amend the current monitoring program as deemed necessary.*"

Based on information provided in the GHD (2017) GMP, the following is understood:

- The landfill has been in operation since 1993;
- The facility receives domestic, commercial and industrial waste and recycling materials from the Muswellbrook municipality, local mine site and the Upper Hunter Region;
- The base of the landfill cell is reported to grade towards a single deleaching well centrally located along the northern pit wall. It is understood leachate water is pumped from the deleaching well via a windmill and transferred to a storage dam for evaporation and recirculation. The base of the landfill cell lies approximately 15 m above the current groundwater elevation within siltstone and sandstone strata of generally low permeability. Given the separation distance and the occurrence of groundwater within fractured rock, the risk of leachate impact to groundwater beneath the site is considered to be low.
- Given the distance to receiving surface waters (Hunter River 2km to the west), the risk of impact to groundwater dependent ecosystems (GDEs) is considered to be low.
- A number of registered bores were identified at some distance (>1km) from the site. Most were installed within alluvial stratum and were considered to no longer be in operation. Given the distance to down gradient groundwater users, the low quality and limited beneficial use of groundwater (stock supply), the risk of impact to any down gradient groundwater users is considered to be low.
- The landfill operates under NSW EPA Protection License 5980. The license stipulates quarterly monitoring of one onsite location (leachate well) via grab sampling for a range of analytes including; alkalinity, ammonia, biological oxygen demand, calcium, chloride, fluoride, iron, magnesium, manganese, nitrate, organochlorine pesticides (OCPs), pH, potassium, sodium, sulfate, total organic carbon, total phenolics and total suspended solids.
- The original groundwater monitoring network for the landfill was installed in 1999 and comprised four groundwater monitoring wells (MP1 to MP4), MP2 is located on the current site, MP1 is located upgradient to the east of the southern portion of the site, MP4 is located upgradient to the north east of the site (on the eastern side of the landfill), and MP3 is located down gradient to the west of the site. MP1 has been consistently dry since installation and MP3 has been blocked (backfilled) since 2007. Prior to 2007, too few data points prevent water level trend interpretation at this location. Water levels in MP2 and MP4 have been inconsistently monitored since installation with MP2 regularly gauged as dry.

- A leachate monitoring well (MP5) was installed central to the landfill in 2003. Depth to leachate was gauged at 6.43 in 2017. Water levels at this location are not representative of groundwater which was gauged in 2017 at approximately 17.53m deep in MP2, located on the current site.

CBased Environmental Pty Ltd – Groundwater Monitoring

Quarterly groundwater sampling and methane gas sampling is carried out by CBased Environmental Pty Ltd on behalf of Council.

The February 2022 results for groundwater monitoring wells (MP2 (gauging only), MP2a and MP4a) and methane gas sampling locations (Old Section, Near Leachate Wall, Elevated Area and Near MP2) were provided to Qualtest by Council. The groundwater monitoring well locations MP2, MP2a and gas sampling point Near MP2 are located in the central north of the current site. Information regarding the construction procedure for the monitoring wells/gas sampling locations and sampling methodologies have not been provided to Qualtest.

No data assessment or analysis of the data was also provided. Based on information supplied the following is understood for groundwater monitoring wells MP2, MP2a, MP4a and gas monitoring locations:

- Depth to groundwater in MP2 and MP2a (understood to be on the current site) was recorded at 17.23m and 47.25m bgs, respectively. Depth to groundwater in MP4a was 55.80m bgs;
- Methane was reported below detection limits in gas monitoring locations Near MP2 and Elevated Area, understood to be located to the north east of the site. Monitoring locations Old Section and Near Leachate Wall, located further to the north east, reported methane levels at 480mg/m^3 and 11.1mg/mg^3, respectively. The gas monitoring locations are shown on Figure 5, Appendix A. It is noted that no monitoring ID's were provided for the gas monitoring locations and the ID's have been assumed based on description of the samples;
- pH was recorded at 6.5 and 6.97 in MP2a and MP4a, respectively; and
- Concentrations of ammonia, phenols and OCPs were reported below the laboratory detection limits in MP2a. Slightly elevated concentrations of ammonia were reported in MP4a (0.04mg/L) and phenols and OCPs were reported below the laboratory detection limits in MP4a.

No assessment of the acidity and alkalinity parameters was carried out by Qualtest.

3.8 Summary of Site History

The site history review showed:

- The site was crown land prior to 1993. Muswellbrook Shire Council has owned the site since 1993. The Council Waste and Recycling Facility was constructed in 1993. As part of the Waste and Recycling Facility, land fill activities are carried out directly to the north east of the site.
- Anecdotal information suggests that prior to the site being owned by Council and being developed as a Waste and Recycling Facility, the site was utilised as an open cut coal mine by Muswellbrook Coal Company (open cut mine understood to be located in the vicinity of the landfilling activities to the north east of the site). Prior to Muswellbrook Coal Company utilising the land, the site was undeveloped "greenfield" site.
- Some disturbed land and possible filling was observed across the site dating back to 1958. A potential rail line was also present running in an east west direction through the central

and southern portion of the site, likely associated with former coal mining located to the north east of the site. From the early 1990's to the present day the site has been generally vacant vegetated land used for the storage of unknown materials and equipment.

- During the site walkover large areas of filling and stockpiles were observed across the site. Anecdotal information and site observations suggests that the filling and stockpiles was likely mining overburden produced by Muswellbrook Coal Company.

3.9 Potential Offsite Sources of Contamination

Landfilling works are carried out by Muswellbrook Waste & Recycling facility to the north east of the site. Based on the GMP (GHD, 2017) the risk of leachate impact to groundwater beneath the site is considered to be low. Based on CBased Environmental Pty Ltd methane monitoring results the risk of methane impacting the site is also considered to be low to medium, however as no monitoring is carried out on the site, this would need to be assessed.

Based on the above, the risk of the landfill causing contamination on the site that could preclude it from being developed as Community Infrastructure Depot (part of the Waste & Recycling Facility), is considered to be low, however assessment of soil vapour risk would be required.

3.10 Gaps in the Site History

Whilst the site history is reasonably comprehensive there are some gaps identified in the review as follows:

- Activities carried out on the site prior to 1958 and in the 1960s are not well known, however anecdotal evidence suggests the site was vacant land prior to being used as an open cut coal mine;
- The origin and quality of the stockpiles and fill materials observed across the site are not well known, although anecdotal evidence suggest the stockpiles may be overburden produced from the former open cut coal mine; and
- It is not clear if any former buildings were previously constructed on the site and if any former buildings were to exist, if they were constructed using hazardous building materials (i.e., asbestos, lead paint).

3.11 Areas of Environmental Concern (AECs) and Chemicals of Potential Concern (COPC)

Based on the findings of the preliminary contamination assessment, Areas of Environmental Concern (AECs) and Chemicals of Potential Concern (COPC) have been identified for the site, and are shown in Table 3.11 below.

Table 3.11 – AECs and COPC

AEC	Potentially Contaminating Activity	Potential COCs	Likelihood of Contamination
1. Imported Fill (placed and stockpiled)	Potential use of imported fill of unknown quality and origin.	TRH, BTEX, PAH, Metals, Asbestos, OCPs	Low to medium
2. Potential former buildings across the site	Weathering of potentially hazardous materials (asbestos, lead paint, galvanised metals)	TRH, BTEX, PAH, Metals, Asbestos	Low
3. Storage of unknown materials/objects and equipment	Potential storage of hazardous materials (asbestos, lead paints), potential use of oils and fuels.	Asbestos, Metals, TRH, BTEX, PAH	Low to medium
4. Former mining works and potential infrastructure	Potential use of hazardous building materials (asbestos, lead paints), potential storage and use of oils and fuels.	TRH, PAH, Metals, BTEX, Asbestos,	Low to medium
5. Landfilling works to the north east of the site	Potential migration of contaminated groundwater and gases from landfill works to the site.	TRH, PAH, Metals, BTEX, Asbestos, OCPs, OPPs, methane,	Low to medium

4.0 Data Quality Objectives

4.1 Step 1 – State the Problem

The site is proposed for re-development and the soil contamination status is unknown. There is a potential for contamination to exist on the site from the AECs identified, and needs to be further investigated to assess if there is a need for remediation and/or management.

4.2 Step 2 – Identify the Decisions

The decisions to be made based on the assessment are:

- Is the site characterisation sufficient to provide adequate confidence in the above decisions?
- Are the concentrations of COPCs above the adopted landuse criteria?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is the site suitable for the proposed development, from a contamination perspective?

- Will the site require remediation or management, and if so, what level and type of remediation/management will be required to make the site suitable for the proposed land use, from a contamination perspective?

4.3 Step 3 – Identify the Inputs to the Decisions

Inputs into the decision are:

- Have samples been collected in the required areas of the site (the identified AECs)?
- 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;
- Laboratory results (concentrations of contaminants in soil);
- QA/QC documentation and data;
- Adopted assessment criteria (see Section 6); and,
- Relevant NSW EPA endorsed Guidelines.

The media to be sampled and analysed is:

- Soil.

4.4 Step 4 – Define the Study Boundaries

The property is located at 252 Coal Road, Muswellbrook, and comprises part Lot 1 DP819014 within the Muswellbrook Shire Council government area.

The site is approximately 2.6ha and located in the south-western to western portion of Lot 1 DP819014 (refer to Figure 2, Appendix A). Vertically, the study boundary will be defined by the depth of soil contamination. It is anticipated the vertical boundary would be depth to groundwater (approximately 17m bgs)

Temporally the study boundaries date from the earliest aerial photograph (1958) to the date of sample collection (June 2022).

4.5 Step 5 – Develop a Decision Rule

Chemicals of Potential Concern (COPCs) are identified in Section 3.11, above. The COPCs and the associated assessment criteria are listed in Section 6 below.

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; and

- 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. This is provided samples have been collected at the required frequencies (as per NSW EPA guidelines) and adequately represent the conditions on site, if not, additional sampling may be required.

4.6 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 (including sampling frequency);
- 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.

4.7 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 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.

5.0 Field and Laboratory Investigations

5.1 Sampling Plan

The NSW EPA (1995) Sampling Design Guidelines recommends a minimum of 36 sample locations to characterise a site of 2.6ha. Based on the site history review and desk study which indicated a low to medium potential for contamination to exist on the site from past activities, a reduced sampling density has been adopted.

The following sampling was completed:

- Drilling of nine boreholes (BH01 to BH09) and collection of soil samples; and
- Collection of surface soil samples from nine locations (S1 to S4 and SS1 to SS5).

As the site walkover and sampling were carried out at the same time, a targeted sampling method, where samples were collected based on areas of environmental concern identified while onsite, was carried out.

The sampling locations are shown on Figures 4, Appendix A.

5.2 Soil Sampling

5.2.1 Boreholes

The boreholes were drilled using a 2.7-tonne excavator equipped with a 300mm auger. The boreholes were drilled into natural soils/weathered rock, or prior refusal. Samples were collected at the surface and 0.5m intervals in fill materials, and at the top of natural residual soils/weathered rock. Samples were collected directly from the excavator auger. A clean pair of nitrile gloves were used when handling each sample.

The soil samples for chemical analysis were placed into 250mL laboratory supplied glass jars and zip locked bags for laboratory analysis. Each soil sample was placed directly into an ice-chilled esky and remained chilled during fieldwork and transportation to the laboratory.

5.2.2 Surface Soil Sampling

The surface samples (SS1 to SS5 and S1 to S4) were collected at 0.0-0.1m depth using hand tools, which were decontaminated between sampling locations. A clean pair of disposable nitrile gloves was used whilst handling each new sample.

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

5.3 Laboratory Analysis

The samples were dispatched to the NATA-accredited Eurofins MGT laboratory under chain of custody conditions.

19 soil samples were selected for analysis based on field observations. The soil samples were analysed for the following:

- Total Recoverable Hydrocarbons (TRH) – 8 primary samples;
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) – 8 primary samples;
- Polycyclic Aromatic Hydrocarbons (PAHs) – 8 primary samples;
- Metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury) – 19 primary samples;
- OCP's/OPP's – 3 primary samples;
- pH and Cation Exchange Capacity (CEC) – 2 primary samples; and,
- Asbestos (ID) – 19 primary soil samples.

6.0 Investigation Criteria

6.1 Soil Investigation Levels

6.1.1 Health and Ecological Levels (Soil)

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) are generally used in NSW when selecting investigation levels for chemical contaminants in soil.

The purpose of the ASC NEPM (2013) is to '*establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry*'.

ASC NEPM (2013) provides health and ecological investigation and screening levels for different exposure scenarios based on a proposed land use. Health and ecological investigation and screening levels are applicable to the first stage (Tier 1) of site assessment and are used to assist in the iterative development of a Conceptual Site Model (CSM). 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 ACL has been calculated using ABC from Olszowy et al (1995), and the soils pH, Cation Exchange Capacity (CEC) and clay content.

The ESLs are associated with petroleum compounds and fractions and are dependent on specific soil physical properties (i.e. coarse and fine-grained soil).

Based on the proposed site use the investigation and screening levels for Commercial/industrial land use with accessible soil have been adopted (HIL D, EIL D, HSL D, and ESL D), and are shown in Table 6.1.4 below.

6.1.2 Management Limits

The ASC NEPM (2013) provides management limits for petroleum hydrocarbons. The purpose of the Management Limits is to 'avoid or minimise' potential effects of petroleum hydrocarbons. NEPM (1999, amended 2013) Schedule B(1) provides these as effects as:

- Formation of observable Light Non-Aqueous Phase Liquid (LNAPL);
- Fire and explosive hazards; and,
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons.

Management limits were derived by Canada-Wide Standard for Petroleum Hydrocarbons (CWS-PHC) in Soil (2008) where the lowest limiting value for each effect became the Recommended Management Limit. Based on site specific information, the applicability of management limits as soil investigation levels for the site was reviewed, and is discussed further in Table 6.1.2 below.

Table 6.1.2 discusses the derivation of the revised management limits. These management limits will be applied to soils. As described in the ASC NEPM (2013) the magnitude of an exceedance will be considered in the context of whether the exposure pathways are plausible and whether exposure will result in harm. Depending on the level of the exceedance further qualitative or quantitative risk assessment may be required.

Table 6.1.2: Site Specific Applicability of Management Limits

TRH Fraction	Basis of Recommended Management Limits (coarse soils)	Appropriateness of Recommended Management Limits for Adopted Criteria
F1 (C6-C10)	Formation of free phase NAPL *700mg/kg* Effects on Workers in Trenches *1,000mg/kg* Fire/Explosion Risk *1,400mg/kg*	The limiting value of **700mg/kg** for formation of free phase NAPL is considered appropriate. The value for effects on workers is not considered relevant as HSLs have been derived for Australian conditions and considered to be more appropriate.
F2 (C10-C16)	Effects on Workers in Trenches *1,000mg/kg* Formation of free-phase *Total F1 to F3 10,000mg/kg* Fire/Explosion Risk *5,200mg/kg*	'Effects on Workers in Trenches' is not appropriate for adoption as a criteria. These values are based on occupational exposure limits for gasoline and jet fuel, as there is no relevant acute toxicity endpoints available. CRC Care (2011) has established HSLs for 'Intrusive Maintenance Worker' for both vapour intrusion and direct contact of 'Not Limiting' and 20,000mg/kg respectively. HSLs are considered more appropriate for Australian conditions and the robustness in which they are derived.

TRH Fraction	Basis of Recommended Management Limits (coarse soils)	Appropriateness of Recommended Management Limits for Adopted Criteria
		The limiting value of **5,200mg/kg** for explosion risk to intrusive maintenance workers is considered appropriate.
F3 (C16-C34)	Effectiveness of bioremediation *3,500mg/kg* Formation of free phase NAPL *Total F1 to F3 10,000mg/kg*	'Effectiveness of bioremediation' is not appropriate as a validation criteria, rather more of a guide for assessing whether bioremediation may be a viable option. It should be noted that this criterion was developed based on Canadian conditions, where bioremediation may not be as accelerated compared to the generally warmer Australian climate. The limiting value of **10,000mg/kg** for formation of free phase NAPL is considered appropriate.
F4 (C34-C40)	Formation of free phase NAPL 10,000mg/kg	The limiting value of **10,000mg/kg** for formation of free phase NAPL is considered appropriate.

6.1.3 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, updated 2021) Guidelines that presented risk-based screening levels for asbestos in soil under various land use 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.

For the purposes of this investigation, as testing was carried out on a presence/absence basis, a criteria of detected has been adopted.

6.1.4 Adopted Soil Criteria

The adopted assessment criteria (for commercial/industrial land use) are listed in Table 6.1.4 below.

Table 6.1.4: Adopted Soil Assessment Criteria for Human Health and Environment

COC	HIL / HSL D (mg/kg)[1,2]	EIL / ESL D[3] (mg/kg)	Management Limits (mg/kg)
TRH C6-C10 less BTEX (F1)	260	-	-
TRH >C10-C16 less Naphthalene (F2)	NL	-	-
TRH >C6 - C10	-	215	700
TRH >C10 - C16	-	170	5,200
TRH >C16 - C34	-	2500	10,000
TRH >C34 - C40	-	6600	10,000
Benzo(a)pyrene	-	1.4	-
Carcinogenic PAH as B(a)p TEQ	40	-	-
Total PAHs	4,000	-	-
Arsenic	3,000	160	-
Cadmium	900	-	-
Chromium	3,600 (CrVI)	530^ (CrIII)	-
Copper	240,000	340^	-
Lead	1,500	1,800	-
Nickel	6,000	610^	-
Mercury	730	-	-
Zinc	400,000	1100^	-
Naphthalene	NL	370	-
Benzene	3	75	-
Toluene	NL	135	-
Ethylbenzene	NL	165	-
Total Xylene	230	180	-
DDT + DDE + DDD	3,600	-	-
DDT	-	640	
Aldrin and dieldrin	45	-	-
Chlordane	530	-	-
Endosulfan	2,000	-	-

COC	HIL / HSL D (mg/kg)[1,2]	EIL / ESL D[3] (mg/kg)	Management Limits (mg/kg)
Endrin	100	-	-
Heptachlor	50	-	-
Hexachlorobenzene (HCB)	80	-	-
Methoxychlor	2,500	-	-
Mirex	100	-	-
Toxaphene	160	-	-
Chlorpyrifos	2,000	-	-
Asbestos – bonded and FA/AF	Detect	-	-
Asbestos – bonded	Detect	-	-

Notes:
^ Based on an average pH of 6.6, average CEC of 30.5meq/100g and clay content of 10% and using Ambient Background Concentration obtained from Olszowy et al (1995) using urban soils, old suburbs with high traffic, 25% percentile.
NL – Not limiting
1 – ASC NEPM (2013) - Health Investigation Levels- HIL D
2 - ASC NEPM - Soil Health Screening Levels for Vapour Intrusion, Commercial/industrial, Clay 0m to <1m
3 - ASC NEPM (2013) - Ecological Investigation and Screening Levels, Commercial/industrial, fine texture soils
4 - ASC NEPM (2013) Management limits for TRH fractions F1-F4 in soil, commercial/industrial, coarse texture (adjusted as described in Section 6.3, above)

7.0 Quality Assurance/Quality Control

Sampling activities were undertaken in accordance with normal, industry accepted practices and standards. 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 J.

Data Quality Indicators (DQIs) applicable for this assessment are shown below. The DQIs were based on field and laboratory quality assurance / quality control (QA / QC) procedures. This included:

Field Quality Control

- Field works carried out by trained personnel;
- Calibrated field instruments were used;
- Re-useable sampling equipment was decontaminated between sampling locations to prevent cross-contamination;
- Samples were collected in appropriately preserved sampling containers;
- Samples were stored in ice cooled chests and transported to the NATA accredited environmental testing laboratory under chain of custody conditions. Samples were transported by courier to ensure compliance with maximum holding times; and,
- Field quality control samples were collected as outlined in the table below.

Laboratory Quality Control

Laboratory QC included the following:

- The laboratory analysis of samples by a NATA accredited environmental testing laboratory;
- The NATA accredited environmental testing laboratory implemented a quality control plan conforming to the National Environmental Protection (Assessment of Site Contamination) Measure (ASC NEPM 2013) Schedule B(3) Guidelines for Analysis of Potentially Contaminated Soils;
- The laboratory performed method blanks, laboratory control spike, matrix spikes, surrogate spikes, and duplicates to assess the laboratory quality control.

Qualtest checked the laboratory quality control data as follows:

- Checked that the reporting limits and procedures were satisfactory;
- Checked that the samples were analysed within holding times;
- Checked that laboratory blanks were less than the laboratory reporting limits;
- Checking the reproducibility of samples by calculating the Relative Percentage Differences (RPDs) between primary and duplicate laboratory samples using a control limit of 30% (where the concentration is more than 10 x the LOR). It was noted that different laboratories adopt different control limits, and these would be adopted as relevant; and
- Checking that laboratory spikes, surrogate spikes, matrix spikes and duplicate matrix spike recoveries are within acceptable control limits. It is noted that different laboratories adopt different control limits, and these will be adopted as relevant.

A data validation report has been prepared to assess field and laboratory QC, and is attached in Appendix J.

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.18.5.22	Duplicate of BH01 0.0-0.1	Eurofins	Metals, PAHs, TRHs, BTEX
T.18.5.22	Triplicate of BH01 0.0-0.1	ALS	Metals, PAHs, TRHs, BTEX

Primary and intra lab duplicate samples were analysed by the NATA-accredited Eurofins laboratory. The inter-lab duplicate samples were analysed by ALS.

Soil

Table 3, Appendix I, presents the relative percentage differences (RPDs) between the primary duplicate samples. A review of the Qualtest QA / QC results indicates that RPDs were within the acceptable ranges.

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 control limits except for a range of metals (31-35%) and PAHs (40-52%) where the laboratory quoted code Q15 which states: *"The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as*

defined in the Internal Quality Control Review and Glossary page of this report. Based on this the laboratory RPDs are not considered to affect the data; and

- Surrogates and laboratory control samples were within the laboratories acceptable range.

Based on the above, and the data validation report in Appendix J, 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.

8.0 Results

8.1 Subsurface Conditions

A summary of the subsurface profile observed is provided in Tables 8.1 and 8.2, below. Logs of the boreholes are attached.

Table 8.1 – Summary of Geotechnical Units and Soil Types

Unit	Soil Type	Description
1	FILL	Sandy GRAVEL - fine to coarse grained angular to sub-angular and sub-rounded, grey to dark grey, dark grey-brown, pale brown to brown, trace black and orange, fine to coarse grained sand, trace fines of low plasticity, trace coal chitter. Silty SAND - fine grained, grey to dark grey to black, fines of low plasticity. Sandy CLAY - low plasticity, dark grey to dark brown, fine to coarse grained sand, trace fine to medium grained gravel, root affected. Silty Sandy GRAVEL - fine to coarse grained angular to sub-angular, grey to pale brown, with dark grey, trace orange to red-brown, fine to coarse grained sand, fines of low plasticity. Gravelly CLAY - medium to high plasticity, red-brown, dark grey, brown, with some pale brown to pale grey, fine to medium grained angular to sub-angular gravel, trace fine to coarse grained sand. Silty SANDY GRAVEL - fine to coarse grained angular, dark grey to dark brown, fine-grained sand, fines of low plasticity, trace angular cobbles.
2	TOPSOIL	Gravelly Silty SAND - fine to coarse grained, grey-brown, fines of low plasticity, fine to coarse grained, angular grave. Sandy CLAY - low plasticity, brown, fine-grained sand, trace fine grained sub-rounded gravel, root affected
3	Slope Wash	Gravelly Silty SAND - fine to coarse grained, grey, fines of low plasticity, fine to coarse grained, angular gravel.
4	RESIDUAL SOIL	CLAY - medium to high plasticity, pale grey, with pale brown and pale orange, trace red-brown, trace silt. Silty CLAY - medium plasticity, pale grey to white, trace pale brown, with some fine to medium grained angular gravel, with some fine to coarse grained sand. Silty Gravelly CLAY / Clayey GRAVEL – medium plasticity, pale grey to white, trace pale brown, fine to medium grained angular gravel, fine to coarse grained sand.

Unit	Soil Type	Description
		Sandy GRAVEL - fine to medium grained angular, pale brown with some pale grey, fine to coarse grained, with some fines of low plasticity. Clayey GRAVEL - fine to medium grained angular, brown, with pale grey and pale orange, fines of medium plasticity
5	Extremely Weathered Rock	Extremely weathered Siltstone with soil properties: breaks down into Silty Gravelly CLAY / Clayey GRAVEL - medium plasticity, pale grey to white, trace pale brown, fine to medium grained angular gravel, fine to coarse grained sand, with highly weathered rock pockets. Extremely weathered Sandy Siltstone with soil properties: breaks down into Silty Sandy GRAVEL fine to medium grained angular, pale brown, trace pale grey, fine to coarse grained sand, fines of low plasticity. Extremely weathered Sandy Siltstone with soil properties: breaks down into Silty Sandy GRAVEL fine to medium grained angular, pale brown, trace pale grey, fine to coarse grained sand, fines of low plasticity.
6	Highly to Moderately Weathered Rock	SILTSTONE - pale grey to grey, trace orange, estimated medium to high strength. Sandy SILTSTONE - pale grey, with pale brown, fine grained sand in rock matrix, estimated low to high (generally low to medium) rock strength. Sandy SILTSTONE - pale grey, with pale brown, fine grained sand in rock matrix, estimated medium to high rock strength.

Table 8.2 – Summary of Geotechnical Units Encountered at Each Borehole Location

Location	Unit 1 Fill	Unit 2 Topsoil	Unit 3 Slope wash	Unit 4 Residual Soil	Unit 5 Extremely Weathered Rock	Unit 6 Highly to Moderately Weathered Rock
		Depth in metres (m)				
BH01	-	0.00 – 0.15	0.15 – 0.35	0.35 – 2.10	2.10 – 2.60	-
BH02	0.00 – 0.15	-	-	-	-	0.15 – 0.30*
BH03	0.00 – 1.70	-	-	1.70 – 2.60	-	-
BH04	0.00 – 0.55	-	-	0.55 – 0.60	0.60 – 2.60	-
BH05	0.00 – 0.60	-	-	0.60 – 1.20	1.20 – 1.50	1.50 – 1.70*

Location	Unit 1 Fill	Unit 2 Topsoil	Unit 3 Slope wash	Unit 4 Residual Soil	Unit 5 Extremely Weathered Rock	Unit 6 Highly to Moderately Weathered Rock
		Depth in metres (m)				
BH06	-	0.00 – 0.10	-	0.10 – 0.50	-	0.50 – 0.55*
BH07	0.00 – 0.65*	-	-	-	-	-
BH08	0.00 – 1.70	-	-	-	-	1.70 – 1.80*
BH09	0.00 – 1.40*	-	-	-	-	-

*Note: *Refusal on weathered rock*

No anthropogenic materials, stained or odorous soils were observed during drilling.

Table 8.3 – Summary of Soils in Surface Samples

Sample ID	Material Description
S1 to S4	FILL: Gravelly Clay – brown, dark brown, pale-brown and orange-brown with some sand.
SS1	FILL: Gravelly Clay – brown to dark brown.
SS2	FILL: Sandy Gravel – brown to orange-brown, with asphalt at surface.
SS3	FILL: Clayey Gravel – brown and grey, with concrete rubble.
SS4	FILL: Coal chitter and siltstone cobbles, dark grey to black, with some clay fines and sand.
SS5	FILL: Gravel Clay – brown with some sand.

8.2 Laboratory Results

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

The soil laboratory results were compared to the investigation levels described in Section 6. The analytical results indicated that concentrations of contaminants were reported below the adopted criteria.

9.0 Conceptual Site Model

Based on the results of the preliminary and detailed contamination assessment carried out on the site, a Conceptual Site Model (CSM) has been developed.

Table 9.0 – Preliminary Conceptual Site Model

AEC	COPC	Likelihood of Contamination	Mechanism of Contamination	Potentially Affected Media	Human & Ecological Receptors	Potential mechanisms of exposure	Sampling Completed	Potential & Complete Exposure Pathways
1. Imported Fill (placed and stockpiled) • Potential use of imported fill of unknown quality and origin.	TRH, BTEX, PAH, Metals, Asbestos, OCPs	Low to medium	• Top-down and to depth of fill • Leaching of contaminants from fill into underlying soils • Leaching of soil contaminants to surface water and groundwater.	• Fill soils • Underlying soils • Surface water • Groundwater	• Current site users. • Future construction workers & site users. • Soil biota/plants and transitory wildlife. • Offsite surface water – Dams located offsite along the western boundary and unnamed Creek located approx. 300m west of the site. • Offsite groundwater discharge point – Hunter River located approx. 2.2km west of the site.	• Direct dermal contact with contaminated soil and/or surface water • Ingestion of contaminated soil and/or surface water • Inhalation of asbestos fibres, or contaminated soil (as dust) • Inhalation of petroleum hydrocarbon vapours • Leaching of soil contaminants to surface water and/or groundwater • Surface water discharge to Dams located offsite along the western boundary and unnamed creek located 300m west of the site. • Groundwater discharge to the Hunter River located approx. 2.2km west of the site.	BH01 to BH09, S1 to S4 and SS1 to SS5	• Incomplete exposure pathway for current and future construction site users and ecological receptors as no contamination identified. • Incomplete exposure pathway for surface water, as no soil contamination identified. • Incomplete exposure pathway for groundwater based on depth to groundwater >15m bgs and clayey subsoils.
2. Current and former buildings across the site • Weathering of potentially hazardous materials (asbestos, lead paint, galvanised metals)	TRH, BTEX, PAH, Metals, Asbestos	Low	• Top-down leaks/spills, flakes/fibres onto soil. • Leaching of soil contaminants to surface water and groundwater.	• Underlying Soils • Surface water • Groundwater			BH01 to BH07, SS1 to SS3	
3. Storage of unknown materials/objects and equipment • Potential storage of hazardous materials (asbestos, lead paints), potential use of oils and fuels	Asbestos, Metals, TRH, BTEX, PAH	Low to Medium	• Top-down leaks/spills, flakes/fibres onto soil. • Leaching of soil contaminants to surface water and groundwater.	• Aesthetics • Underlying soils • Surface water • Groundwater			BH01 to BH07, SS1 to SS3	
4. Former mining works and potential infrastructure • Potential use of hazardous building materials (asbestos, lead paints), potential storage and use of oils and fuels.	TRH, PAH, Metals, BETX, Asbestos	Low to medium	• Top-down leaks/spills, flakes/fibres onto soil • Leaching of soil contaminants to surface water and groundwater • Migration of ground gases into voids and confined spaces	• Soil • Surface water • Groundwater			BH01 to BH07, SS1 to SS3	

AEC	COPC	Likelihood of Contamination	Mechanism of Contamination	Potentially Affected Media	Human & Ecological Receptors	Potential mechanisms of exposure	Sampling Completed	Potential & Complete Exposure Pathways
5. Landfilling works to the north east of the site • Potential migration of contaminated groundwater and gases from landfill works to the site.	TRH, PAH, Metals, BETX, Asbestos, OCPs, OPPs, methane	Low	• Contaminated groundwater migrating onto the site • Migration of ground gases	• Groundwater • Ground gases	• Current site users. • Future construction workers & site users.	• Direct dermal contact with contaminated groundwater • Ingestion of contaminated groundwater • Inhalation of hazardous ground gases • Accumulation of explosive gases in proposed buildings	NA	• Potential exposure pathway for current and future construction site users from migration of ground gases. Methane was identified to the north east of the site (CBased Environmental Pty Ltd), and no monitoring has been carried out on the site. • Incomplete exposure pathway to groundwater based on the following: - Depth to groundwater >15m bgs and clayey subsoils limiting potential groundwater migration. - GMP (GHD, 2017) states the risk of leachate impact to groundwater beneath the site is considered to be low. - CBased Environmental Pty Ltd monitoring reported concentrations of ammonia, phenols and OCPs below the laboratory detection limits in monitoring well MP2a (located on the site).

10.0 Conclusions and Recommendations

The site history review showed that the site was crown land until 1993 when Muswellbrook Shire Council obtained the site. Council constructed a Waste and Recycling facility adjacent to the north east of the site in 1993. Landfilling activities associated with the Waste and Recycling facility are carried out offsite to the north east. Anecdotal information suggests that prior to the site being owned by Council the site was utilised as an open cut coal mine by Muswellbrook Coal Company. Available information indicates that [prior to Muswellbrook Coal Company utilising the land, the site was an undeveloped greenfield site.

Some disturbed land and possible filling was observed across the site dating back to 1958. A potential rail line was also present running in an east west direction through the central and southern portion of the site, likely associated with former coal mining located to the north east of the site. The former railway line appeared to be removed and replaced with a swale drain in the early 1990s. From the early 1990's to the present day the site has been generally vacant vegetated land used for the storage of unknown materials and equipment. During the site walkover large areas of filling and stockpiles were observed across the site. Anecdotal information suggests that the filling and stockpiles was likely mining overburden produced by Muswellbrook Coal Company.

Five Areas of Environmental Concern (AECs) were identified based on the site history and site observations. The AECs related to: 1. Imported Fill (placed and stockpiled); 2. Current and former buildings across the site; 3. Storage of unknown materials/objects and equipment; 4. Former mining works and potential infrastructure; 5. Landfilling works to the north east of the site.

Sampling and analysis targeted the AECs identified within the proposed development area (excluding AEC 5 groundwater and ground gases), with a targeted soil sampling pattern adopted. The soil laboratory results reported concentrations of contaminants below the adopted human health and ecological criteria.

The Conceptual Site Model did not identify complete exposure pathways for human or ecological receptors for AEC 1 to AEC4. A potentially complete exposure pathway for current and future construction site users was identified for AEC 5 - Landfilling works to the north east of the site as methane was identified to the north east of the site (CBased Environmental Pty Ltd), and no monitoring has been carried out on the site.

Based on the results of the Preliminary and Detailed Contamination Assessment it is considered the site can be made suitable for the proposed commercial/industrial development, with the following recommendations:

- Completion of a ground gas assessment in the vicinity of the proposed buildings; and
- Preparation of a Construction Environmental Plan (CEMP) which will include an Unexpected Finds Procedure (UFP). The CEMP will be implemented during vegetation clearing and earthworks.

Provided the recommendations made within this report are carried out, it is considered that the site could be rendered suitable, from a contamination point of view, for the proposed commercial/industrial development.

It is noted that should any soils require offsite disposal, they will require waste classification in accordance with the NSW EPA (2014) Waste Classification Guidelines.

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). This report comprises a Stage 1 and Stage 2 contamination assessment, as described by State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 4.

11.0 Limitations

This report has been prepared by Qualtest for Muswellbrook Shire Council based on the objectives and scope of work list 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. If this report is reproduced, it must be in full.

12.0 References

CBased Environmental Pty Ltd – Groundwater Monitoring Email – MSC QTY FS COC LAB February 2022

GHD Pty Ltd (2017) - Muswellbrook Waste and Recycling Facility, Groundwater Monitoring Plan, ref:2218757, dated April 2017

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

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

NSW and Department of Planning, Industry and Environment, accessed from espade.environment.nsw.gov.au.

NSW Government ePlanning Spatial Portal accessed from https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

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

NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), Canberra (ASC NEPM 2013).

NSW EPA (1995) Sampling Design Guidelines.

WA Department of Health (2009) Guidelines for the assessment and management of asbestos contaminated sites in Western Australia, WA Department of Health and Department of Environment and Conservation.

WA Department of Health (2021) Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia, WA Department of Health and Department of Environment and Conservation.

NSW EPA (2014) Waste Classification Guidelines

NSW EPA (2007) Guidelines for the Assessment and Management of Groundwater Contamination

State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 4.

APPENDIX A:

Figures

Image obtained on 2 June 2022 from Nearmaps (https://www.nearmap.com/au/en, imagery dated 6 May 2022

Qualtest LABORATORY (NSW) PTY LTD

Client:	MUSWELLBROOK SHIRE COUNCIL	Drawing No:	FIGURE 1
Project:	PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT	Project No:	NEW22P-0092-AA
Location:	252 COAL ROAD, MUSWELLBROOK	Scale:	N.T.S.
Title:	SITE LOCATION PLAN	Date:	2/06/2022

Image obtained on 2 June 2022 from Nearmaps (https://www.nearmap.com/au/en, imagery dated 6 May 2022

Qualtest LABORATORY (NSW) PTY LTD

Client:	MUSWELLBROOK SHIRE COUNCIL	Drawing No:	FIGURE 2
Project:	PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT	Project No:	NEW22P-0092-AA
Location:	252 COAL ROAD, MUSWELLBROOK	Scale:	N.T.S.
Title:	LOT LAYOUT PLAN	Date:	2/06/2022

Image obtained on 12 May 2022 from Nearmaps (https://www.nearmap.com/au/en, imagery dated 4 April 2022

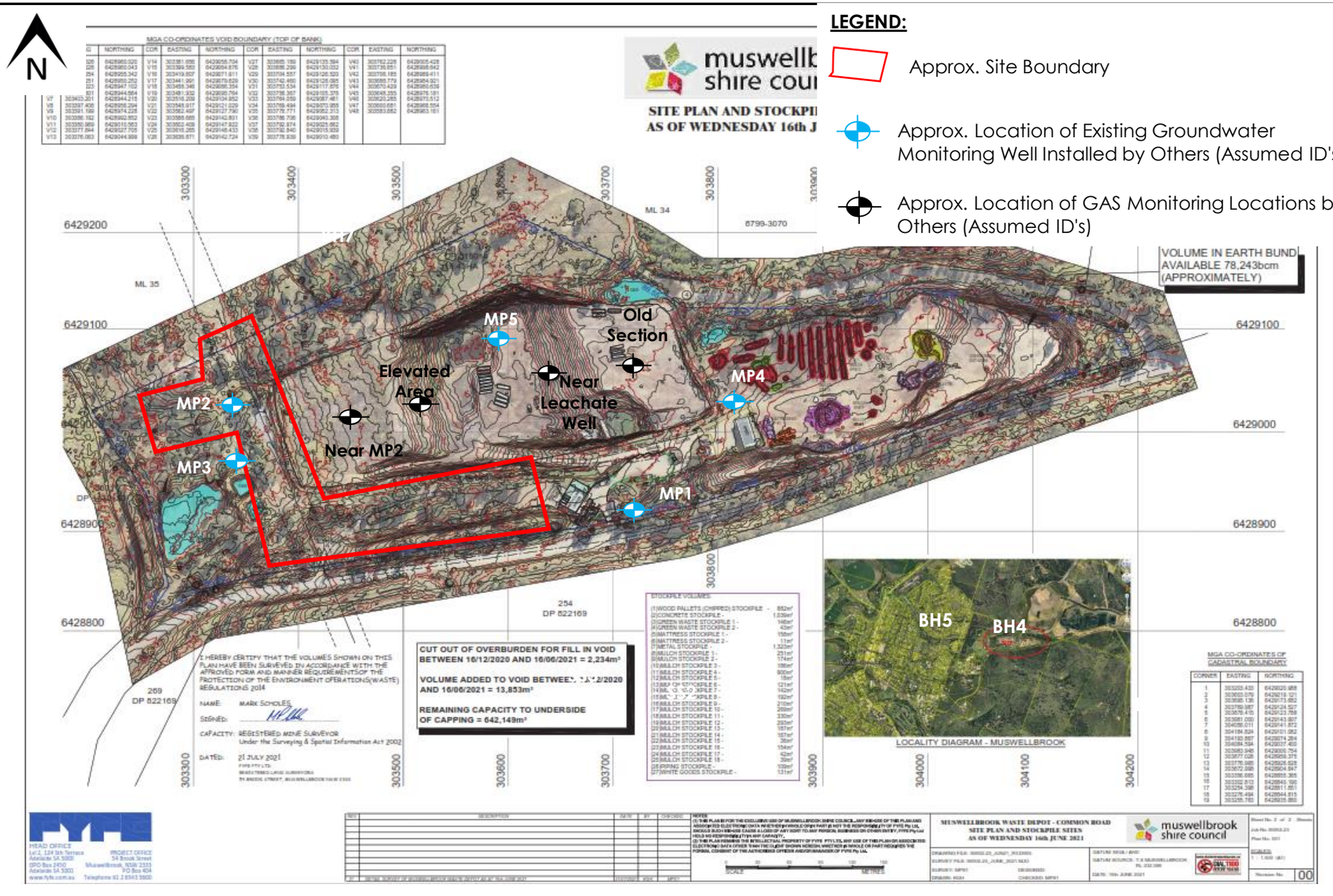
Qualtest LABORATORY (NSW) PTY LTD

Client:	MUSWELLBROOK SHIRE COUNCIL	Drawing No:	FIGURE 3
Project:	PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT	Project No:	NEW22P-0092-AA
Location:	252 COAL ROAD, MUSWELLBROOK	Scale:	N.T.S.
Title:	SITE FEATURES PLAN	Date:	2/06/2022

Image obtained on 12 May 2022 from Nearmaps (https://www.nearmap.com/au/en, imagery dated 4 April 2022

Qualtest LABORATORY (NSW) PTY LTD

Client:	MUSWELLBROOK SHIRE COUNCIL	Drawing No:	FIGURE 4
Project:	PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT	Project No:	NEW22P-0092-AA
Location:	252 COAL ROAD, MUSWELLBROOK	Scale:	N.T.S.
Title:	SAMPLE LOCATION PLAN	Date:	2/06/2022

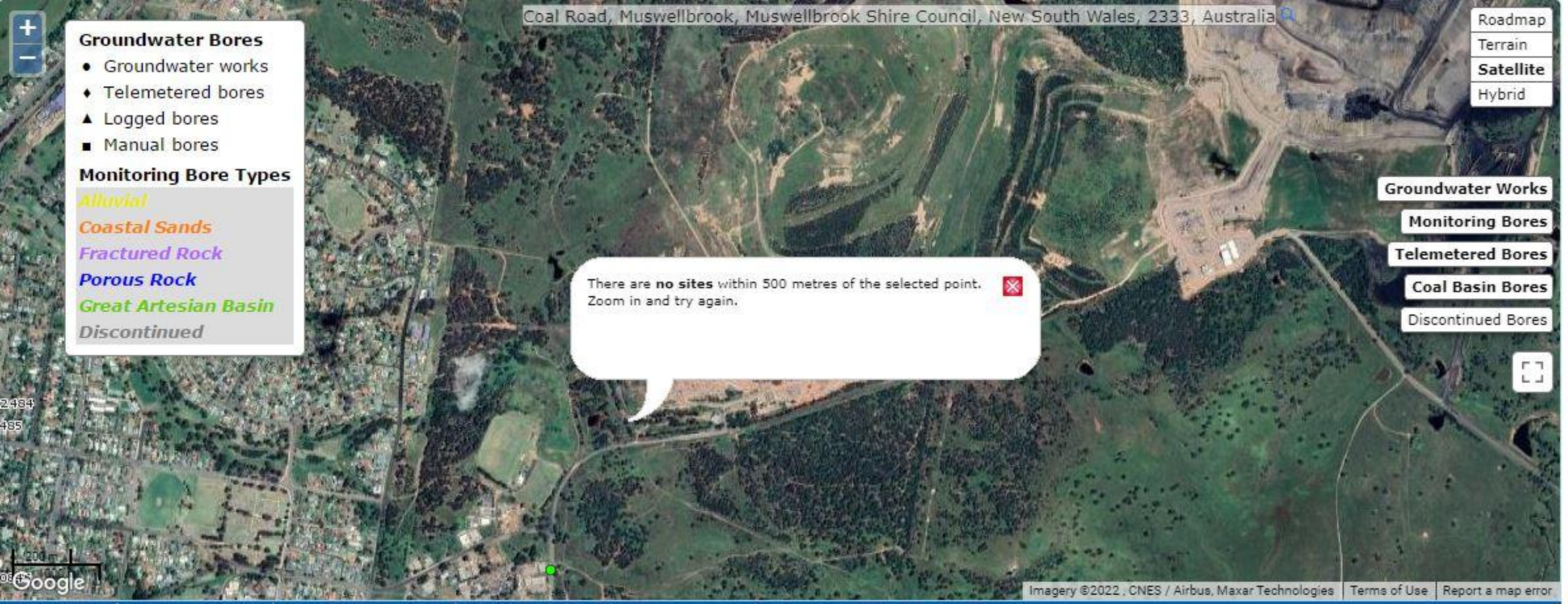


Client:	MUSWELLBROOK SHIRE COUNCIL	Drawing No:	FIGURE 5
Project:	PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT	Project No:	NEW22P-0092-AA
Location:	252 COAL ROAD, MUSWELLBROOK	Scale:	N.T.S.
Title:	EXISTING GROUNDWATER AND GAS SAMPLE LOCATION PLAN (ASSUMED IDs)	Date:	2/06/2022

Qualtest LABORATORY (NSW) PTY LTD

APPENDIX B:

Groundwater Bore Search


Coal Road, Muswellbrook, Muswellbrook Shire Council, New South Wales, 2333, Australia
Groundwater Bores
• Groundwater works
♦ Telemetered bores
▲ Logged bores
■ Manual bores
Monitoring Bore Types
Alluvial
Coastal Sands
Fractured Rock
Porous Rock
Great Artesian Basin
Discontinued
There are no sites within 500 metres of the selected point.
Zoom in and try again.
Roadmap
Terrain
Satellite
Hybrid
Groundwater Works
Monitoring Bores
Telemetered Bores
Coal Basin Bores
Discontinued Bores
200 m
Google
Imagery ©2022 , CNES / Airbus, Maxar Technologies
Terms of Use
Report a map error

APPENDIX C:

Historical Titles

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

18/36 Osborne Road,
Manly NSW 2095

Mobile: 0412 169 809
Email: search@alsearchers.com.au

02nd June, 2022

QUALTEST PTY LTD
2 Murray Dwyer Circuit,
MAYFIELD WEST, NSW 2304

Attention Billy Snow,

RE: **252 Coal Road,**
Muswellbrook
Purchase Order NEW22P-0092

Current Search

Folio Identifier 1/819014 (title attached)
DP 819014 (plan attached)
Dated 31st May, 2022
Registered Proprietor:
THE COUNCIL OF THE SHIRE OF MUSWELLBROOK

Title Tree
Lot 1 DP 819014

Folio Identifier 1/819014

PA 63390

Crown land

Government Gazette 13 April 1888

****

Summary of proprietor(s)
Lot 1 DP 819014

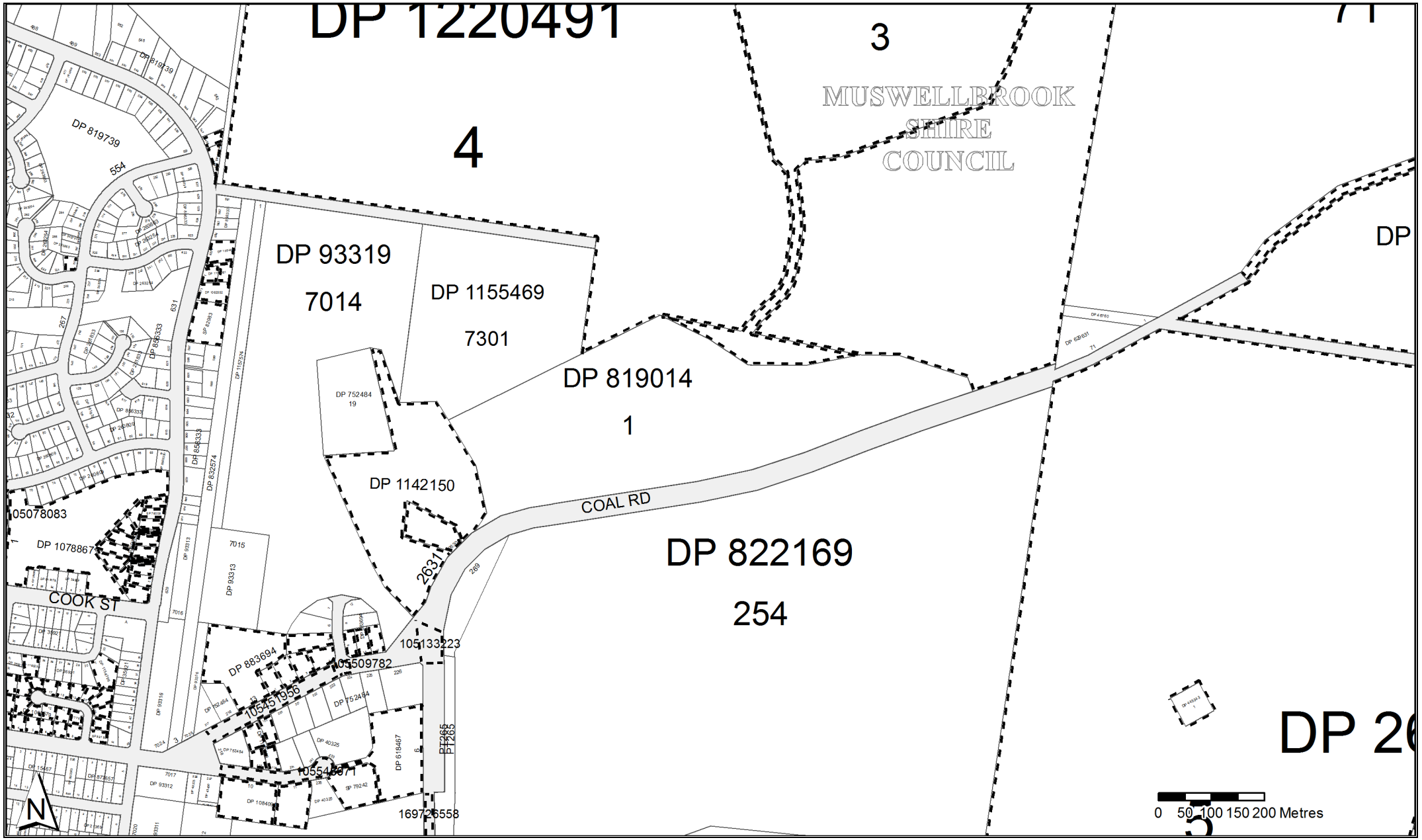
Year	Proprietor(s)	
	(Lot 1 DP 819014)	
15 Feb 1993 – todate	The Council of the Shire of Muswellbrook *(acquired for Sanitary & Rubbish Depot vide Government Gazette 18 December 1992 Fol 8939)*	
	(Crown Land Parish Rowan)	
Prior – 15 Feb 1993	Crown Land	
(13 Apr 1888 to 29 May 1964)	*(dedicated Permanent Common vide Government Gazette 13 Apr 1888)*	

****

Cadastral Records Enquiry Report : Lot 1 DP 819014

Ref : NOUSER

Locality : MUSWELLBROOK
Parish : ROWAN
LGA : MUSWELLBROOK
County : DURHAM



This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

	Status	Surv/Comp	Purpose
DP26760			
Lot(s): 5			
DP1199505	REGISTERED	SURVEY	EASEMENT
Lot(s): 6			
PLAN IS FOR MINERALS ONLY			
DP1189254	REGISTERED	COMPILATION	DEPARTMENTAL
DP263254			
Lot(s): 223			
DP1052573	REGISTERED	SURVEY	EASEMENT
DP618467			
Lot(s): 6			
DP1168935	REGISTERED	SURVEY	SURVEY INFORMATION ONLY
DP883694			
Lot(s): 1, 2, 3, 4, 5, 13			
DP1111032	REGISTERED	SURVEY	EASEMENT
Lot(s): 9, 10, 11			
DP1053495	REGISTERED	COMPILATION	EASEMENT
DP1050765			
Lot(s): 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14			
DP856333	HISTORICAL	SURVEY	SUBDIVISION
DP1054644			
Lot(s): 6276			
DP856333	HISTORICAL	SURVEY	SUBDIVISION
DP1059027			
Lot(s): 7, 8			
DP376388	HISTORICAL	SURVEY	UNRESEARCHED
Lot(s): 1, 2, 3, 4, 5, 6, 7			
DP368904	HISTORICAL	SURVEY	UNRESEARCHED
DP1062552			
Lot(s): 6271			
DP856333	HISTORICAL	SURVEY	SUBDIVISION
DP1063579			
Lot(s): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23			
DP368904	HISTORICAL	SURVEY	UNRESEARCHED
DP376388	HISTORICAL	SURVEY	UNRESEARCHED
DP1059027	HISTORICAL	SURVEY	SUBDIVISION
DP1078867			
Lot(s): 1			
DP260809	HISTORICAL	SURVEY	SUBDIVISION
DP856333	HISTORICAL	SURVEY	SUBDIVISION
DP1084094			
Lot(s): 10, 11			
DP43430	HISTORICAL	SURVEY	CROWN FOLIO CREATION
DP752484	HISTORICAL	COMPILATION	CROWN ADMIN NO.
DP1104961			
Lot(s): 1, 2			
DP856333	HISTORICAL	SURVEY	SUBDIVISION
DP1062552	HISTORICAL	SURVEY	SUBDIVISION
DP1142150			
Lot(s): 2630, 2631			
DP822195	HISTORICAL	SURVEY	ROADS ACT, 1993
DP1148216			
Lot(s): 101			
DP629631	HISTORICAL	SURVEY	SUBDIVISION
DP1114789	HISTORICAL	COMPILATION	ROADS ACT, 1993
PLAN IS FOR MINERALS ONLY			
DP1189254	REGISTERED	COMPILATION	DEPARTMENTAL
NSW GAZ. 17-08-2007 CLOSED ROAD LOT 1 DP1114789 - SEE AD511654			Folio : 5783

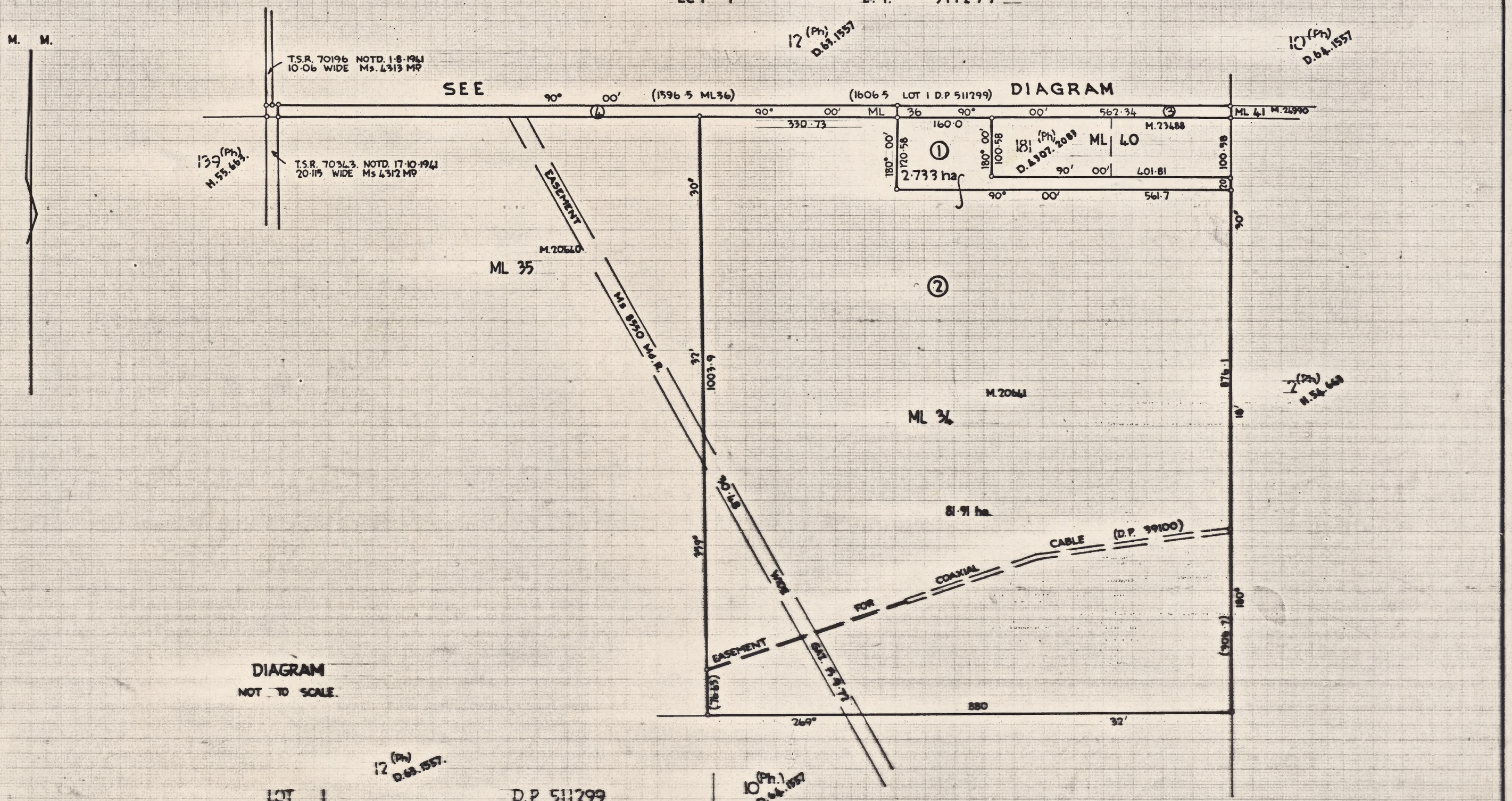
	Status	Surv/Comp	Purpose
DP1154706			
Lot(s): 1			
DP35921	HISTORICAL	SURVEY	UNRESEARCHED
DP1155225	REGISTERED	COMPILATION	EASEMENT
NSW GAZ. 11-03-2011 Folio : 1957			
LOT 1 DP1154706 VESTED BY THE HOUSING ACT 2001			
DP1160230			
Lot(s): 1			
DP35921	HISTORICAL	SURVEY	UNRESEARCHED
NSW GAZ. 11-03-2011 Folio : 1957			
LOT 1 DP1160230 VESTED BY THE HOUSING ACT 2001			
DP1167688			
Lot(s): 101, 102			
DP752484	HISTORICAL	COMPILATION	CROWN ADMIN NO.
Lot(s): 103, 104			
DP40325	HISTORICAL	SURVEY	CROWN FOLIO CREATION
DP1167805			
Lot(s): 5400, 5401			
DP819739	HISTORICAL	SURVEY	SUBDIVISION
DP1220491			
Lot(s): 3, 4			
DP578075	HISTORICAL	SURVEY	SUBDIVISION
DP1149806	HISTORICAL	SURVEY	CROWN FOLIO CREATION
Road			
Polygon Id(s): 105133223, 105451956, 105509782, 105548071			
DP1168935	REGISTERED	SURVEY	SURVEY INFORMATION ONLY
Polygon Id(s): 169726558			
NSW GAZ. 09-08-2013 Folio : 3677			
DEDICATED PUBLIC ROAD			
LOTS 271-272 DP1065478			
SP76005			
DP856333	HISTORICAL	SURVEY	SUBDIVISION
DP1050765	HISTORICAL	SURVEY	SUBDIVISION
SP77636			
DP368904	HISTORICAL	SURVEY	UNRESEARCHED
DP376388	HISTORICAL	SURVEY	UNRESEARCHED
DP1059027	HISTORICAL	SURVEY	SUBDIVISION
DP1063579	HISTORICAL	SURVEY	SUBDIVISION
SP79242			
DP40325	HISTORICAL	SURVEY	CROWN FOLIO CREATION
DP1115343	HISTORICAL	SURVEY	REDEFINITION
SP82983			
DP856333	HISTORICAL	SURVEY	SUBDIVISION
DP1062552	HISTORICAL	SURVEY	SUBDIVISION
SP88193			
DP368904	HISTORICAL	SURVEY	UNRESEARCHED
DP376388	HISTORICAL	SURVEY	UNRESEARCHED
DP1059027	HISTORICAL	SURVEY	SUBDIVISION
DP1063579	HISTORICAL	SURVEY	SUBDIVISION
Road			
Polygon Id(s): 105072442, 105078083			
DP1245179	REGISTERED	SURVEY	SURVEY INFORMATION ONLY

Plan	Surv/Comp	Purpose
DP11606	SURVEY	UNRESEARCHED
DP15467	SURVEY	UNRESEARCHED
DP15591	SURVEY	UNRESEARCHED
DP21369	SURVEY	UNRESEARCHED
DP26760	SURVEY	UNRESEARCHED
DP35921	SURVEY	UNRESEARCHED
DP39069	SURVEY	UNRESEARCHED
DP40325	SURVEY	CROWN FOLIO CREATION
DP43430	SURVEY	CROWN FOLIO CREATION
DP46760	COMPILATION	CROWN FOLIO CREATION
DP93311	COMPILATION	DEPARTMENTAL
DP93312	COMPILATION	DEPARTMENTAL
DP93313	COMPILATION	DEPARTMENTAL
DP93316	COMPILATION	DEPARTMENTAL
DP93319	COMPILATION	DEPARTMENTAL
DP260394	SURVEY	SUBDIVISION
DP260809	SURVEY	SUBDIVISION
DP261832	SURVEY	SUBDIVISION
DP261833	SURVEY	SUBDIVISION
DP263254	SURVEY	SUBDIVISION
DP263862	SURVEY	SUBDIVISION
DP263863	SURVEY	SUBDIVISION
DP329593	COMPILATION	UNRESEARCHED
DP363849	COMPILATION	UNRESEARCHED
DP436062	COMPILATION	UNRESEARCHED
DP445343	SURVEY	UNRESEARCHED
DP506828	COMPILATION	SUBDIVISION
DP514181	SURVEY	SUBDIVISION
DP615176	COMPILATION	SUBDIVISION
DP618467	COMPILATION	OLD SYSTEM CONVERSION
DP629631	SURVEY	SUBDIVISION
DP663978	COMPILATION	DEPARTMENTAL
DP752484	COMPILATION	CROWN ADMIN NO.
DP791056	SURVEY	SUBDIVISION
DP803303	COMPILATION	SUBDIVISION
DP819014	SURVEY	RESUMPTION OR ACQUISITION
DP819739	SURVEY	SUBDIVISION
DP822169	SURVEY	CROWN FOLIO CREATION
DP832574	SURVEY	RESUMPTION OR ACQUISITION
DP835738	SURVEY	SUBDIVISION
DP843730	SURVEY	SUBDIVISION
DP856333	SURVEY	SUBDIVISION
DP877657	SURVEY	SUBDIVISION
DP883694	SURVEY	SUBDIVISION
DP905479	SURVEY	CROWN ADMIN NO.
DP1050765	SURVEY	SUBDIVISION
DP1054644	COMPILATION	CONSOLIDATION
DP1059027	SURVEY	SUBDIVISION
DP1062552	SURVEY	SUBDIVISION
DP1063579	SURVEY	SUBDIVISION
DP1065478	SURVEY	CROWN FOLIO CREATION
DP1078867	COMPILATION	CONSOLIDATION
DP1084094	SURVEY	SUBDIVISION
DP1104961	SURVEY	SUBDIVISION
DP1142150	SURVEY	SUBDIVISION
DP1148216	COMPILATION	CONSOLIDATION
DP1154706	COMPILATION	CONSOLIDATION
DP1155469	COMPILATION	CROWN LAND CONVERSION
DP1155487	COMPILATION	CROWN LAND CONVERSION
DP1157574	COMPILATION	CROWN LAND CONVERSION
DP1160230	COMPILATION	CONSOLIDATION
DP1167688	SURVEY	SUBDIVISION
DP1167805	SURVEY	SUBDIVISION
DP1220491	SURVEY	SUBDIVISION
SP76005	COMPILATION	STRATA PLAN

Plan	Surv/Comp	Purpose
SP77636	COMPILATION	STRATA PLAN
SP79242	COMPILATION	STRATA PLAN
SP82983	COMPILATION	STRATA PLAN
SP88193	COMPILATION	STRATA PLAN

A305

LOT 1 D.P. 511299



Compiled from information shown in D.P. 511299 and plans catalogued M. 20640, M. 20641 & M. 20706 in the Department of Mines, Sydney.

Plan Approved 28.5.1979
Authorised Officer

0	10	20	30	40	Table of mm	90	100	110	120

Reduction Ratio 1 : 5000

DATUM	SURVEYED	DESIGNED
AZIMUTH	FIELD BOOK	DRAWN
	LEVEL BOOK	CHECKED

DEPARTMENT OF LANDS N.S.W.
CROWN LANDS OFFICE
BRIDGE STREET
SYDNEY
PHONE 20579 EXT.

LAND BOARD OFFICE
EAST MAITLAND
PHONE 937799

LOT (2) PROPOSED TO BE SURRENDERED FROM COAL LEASE 1107 & LOT (4) PROPOSED TO BE SURRENDERED FROM COAL LEASE 1139.

PARISH ROWAN	LAND DISTRICT MUSWELLBROOK
COUNTY DURHAM	COUNCIL MUSWELLBROOK

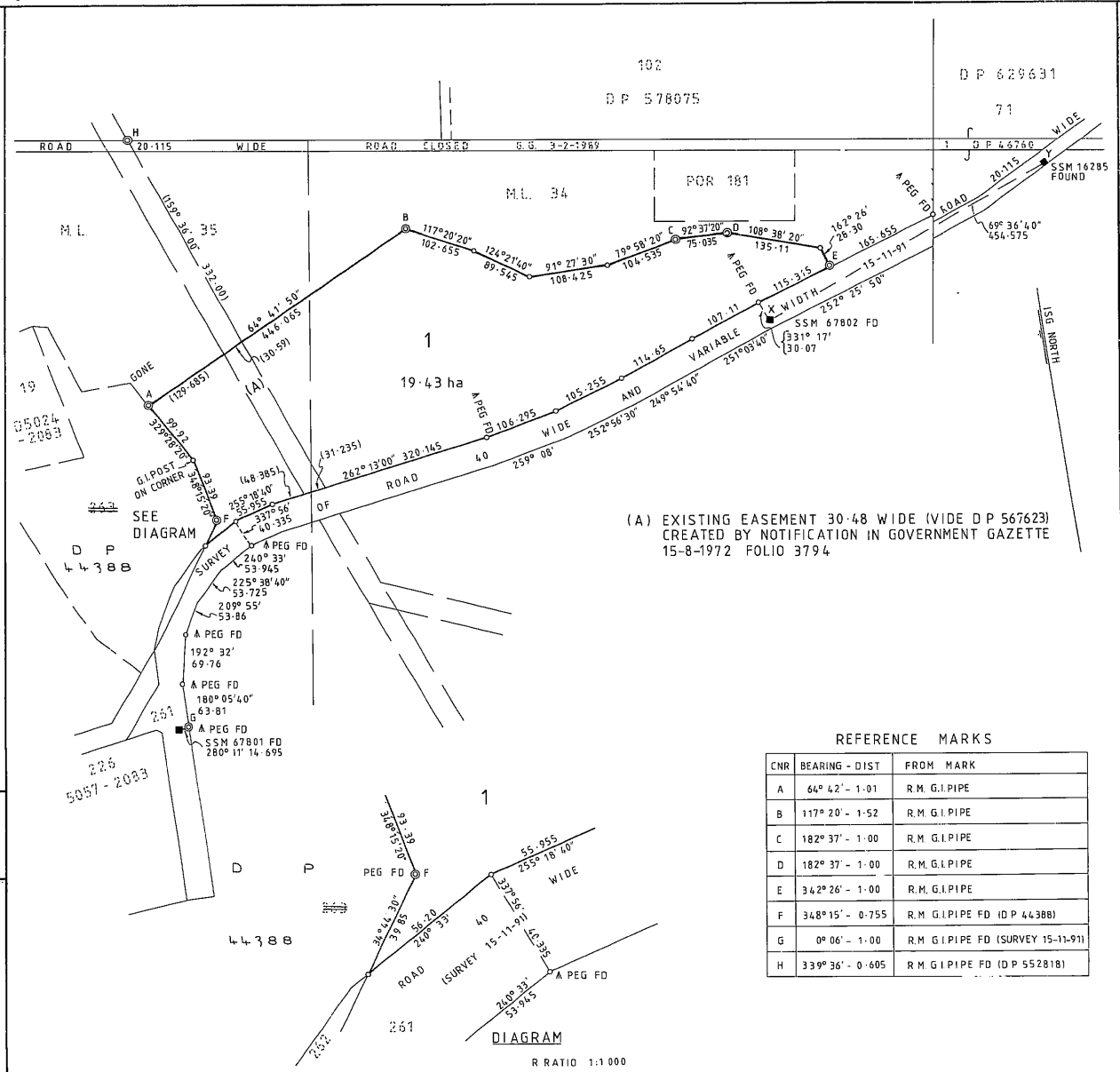
FILE No.	PLAN No.	No. SHEETS	SHEET No.
LB. 76/786	Ms. 8799 MdR		

AMENDMENTS	A	B	C	D	E	F	G

MS. 8799 MD.

PLAN FORM 2 — Plan Drawing only to appear in this space — *OFFICE USE ONLY

SIGNATURES, SEALS AND STATEMENTS of Intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.



REFERENCE MARKS

CNR	BEARING - DIST	FROM MARK
A	64° 42' - 1·01	R.M. G.I.PIPE
B	117° 20' - 1·52	R.M. G.I.PIPE
C	182° 37' - 1·00	R.M. G.I.PIPE
D	182° 37' - 1·00	R.M. G.I.PIPE
E	342° 26' - 1·00	R.M. G.I.PIPE
F	348° 15' - 0·755	R.M. G.I.PIPE FD (D P 44388)
G	0° 06' - 1·00	R.M. G.I.PIPE FD (SURVEY 15-11-91)
H	339° 36' - 0·605	R.M. G.I.PIPE FD (D P 552818)

Crown Lands Office Approval

PLAN APPROVED ..... Authorised Officer

Land District .....

Paper No. .....

Field Book ..... pages .....

Council Clerk's Certificate

I hereby certify that –

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and

*(b) the requirements of Part 3 Division 2 of the Water Board Act 1987 and Water Supply Authorities Act 1987

have been complied with by the applicant in relation to the proposed .....

(Insert "new road", "subdivision" or "consolidated lot") set out hereon

Subdivision No. .....

Date .....

(Signature) ..... Council Clerk

Council File No. .....

*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Metropolitan Water, Sewerage and Drainage Board and the Hunter District Water Board.

*delete if inapplicable.

TOS 2

SURVEYOR'S REFERENCE: S3697-2 "CHECKLIST" MPD

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 Table of mm 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390

D P 819014

Registered: 28.7.1992

C.A.: —

Title System: CROWN LAND

Purpose: ACQUISITION (NOT CURRENT PLAN AT REGN-SEE SEC 327AA L G ACT 1919)

Ref. Map: U9125-4

Last Plan: —

PLAN OF LAND TO BE ACQUIRED FOR TOWN WASTE DISPOSAL

Lengths are in metres. Reduction Ratio 1: 4 000

~~Mun./Shire City~~ MUSWELLBROOK

~~Locality~~: MUSWELLBROOK

Parish: ROWAN

County: DURHAM

~~This is sheet 1 of my plan in ..... sheets.~~ (Delete if inapplicable)

I, GORDON VICTOR BOARDMAN

of G BOARDMAN & ASSOCIATES P/L P O BOX 404, MUSWELLBROOK 2333

a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan .....

is accurate and has been made in accordance with the Survey Practice Regulation 1990, and any special requirements of the Department of Lands, and was completed on

1ST JULY 1992

Signature .....

Surveyor registered under Surveyors Act, 1929, as amended.

Datum Line of Azimuth (X-Y)

#Insert date of survey.

Plans used in preparation of survey/compilation.

SURVEY BY ME 15-11-91

D P 44388

D P 552818

PANEL FOR USE ONLY for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

IT IS INTENDED THAT LOT 1 BE ACQUIRED

10 20 30 40 50 60 70 Table of mm 110 120 130 140

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day. 30th July 1992

Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), Friday 18 December 1992 (No.146), page 8939

MUSWELLBROOK SHIRE COUNCIL

Local Government Act 1919

Land Acquisition (Just Terms Compensation) Act 1991

Notice of Compulsory Acquisition of Land

THE Muswellbrook Shire Council declares, with the approval of His Excellency the Governor, that the land described in the Schedule below is acquired by compulsory process under the provisions of the Land Acquisition (Just Terms Compensation) Act 1991, for a purpose of the Local Government Act 1919, namely providing, maintaining, managing, controlling and regulating a sanitary depot for the disposal of depot-rubbish. Dated at Muswellbrook, 10th December, 1992. L. P. FISHER, Shire Clerk, P.O. Box 122, Muswellbrook, N.S.W. 2333.

SCHEDULE

All that piece or parcel of Crown Land situate at Muswellbrook in the Shire of Muswellbrook, Parish of Rowan, County of Durham, 19.43 hectares being Lot 1 in D.P. 819014, excepting all mines and minerals contained therein. [07370]

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
31/5/2022 3:32PM

FOLIO: 1/819014

First Title(s): OLD SYSTEM
Prior Title(s): PA63390

Recorded	Number	Type of Instrument	C.T. Issue
30/7/1992	DP819014	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
15/2/1993	PA63390	PRIMARY APPLICATION	FOLIO CREATED EDITION 1
14/5/1993	I333576	DEPARTMENTAL DEALING	
23/4/2012	AG884326	TRANSFER GRANTING EASEMENT	EDITION 2

*** END OF SEARCH ***

advlegs PRINTED ON 31/5/2022

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/819014

SEARCH DATE	TIME	EDITION NO	DATE
31/5/2022	3:32 PM	2	23/4/2012

LAND

LOT 1 IN DEPOSITED PLAN 819014
AT MUSWELLBROOK
LOCAL GOVERNMENT AREA MUSWELLBROOK
PARISH OF ROWAN COUNTY OF DURHAM
TITLE DIAGRAM DP819014

FIRST SCHEDULE

THE COUNCIL OF THE SHIRE OF MUSWELLBROOK (PA63390)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS
2 AG884326 EASEMENT FOR ELECTRICITY AND OTHER PURPOSES AFFECTING THE PART DESIGNATED (E) IN PLAN WITH AG884326
3 AG884326 EASEMENT FOR ELECTRICITY PURPOSES AFFECTING THE PART DESIGNATED (A) IN PLAN WITH AG884326

NOTATIONS

I333576 NOTE: ACQUIRED FOR RUBBISH DEPOT GAZ. 18.12.1992 FOL 8939

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

advlegs PRINTED ON 31/5/2022

APPENDIX D:

Aerial Photographs

Aerial photographs

1958

1974

1989

1998

2009


Coal Rd
Image © 2022 Sinclair Knight Merz


Coal Rd
Muswellbrook Waste & Recycling Facility
Coal Rd
Weeraman Fields
Elks Enterprises

2021


Muswellbrook Waste &
Image © 2022 CNES / Airbus
Coal Rd


Muswellbrook Waste & Recycling Facility
Image © 2022 CNES / Airbus

APPENDIX E:

Site Photographs

Photograph 1 - Showing general site conditions, facing west from the south-eastern portion of the site.

Photograph 2 - Showing general site conditions, facing south from the northern portion of the site.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**1 and 2**
	Title:	SITE PHOTOGRAPHS		

Photograph 3 - Showing general site conditions, facing north from the southern portion of the site.

Photograph 4 - Showing roadbase material in access roads.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**3 and 4**
	Title:	SITE PHOTOGRAPHS		

Photograph 5 - Showing access road observed in the southern portion of the site.

Photograph 6 - Showing SP1.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**5 and 6**
	Title:	SITE PHOTOGRAPHS		

Photograph 7 - Showing SP2.

Photograph 8 - Showing Filling Area 1.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**7 and 8**
	Title:	SITE PHOTOGRAPHS		

Photograph 9 - Showing Filling Area 2.

Photograph 10 - Showing Filling Area 3.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**9 and 10**
	Title:	SITE PHOTOGRAPHS		

Photograph 11 - Showing swale drain.

Photograph 12 - Showing scattered rubbish.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**11 and 12**
	Title:	SITE PHOTOGRAPHS		

Photograph 13 - Showing thin layer of concrete rubble.

Photograph 14 - Showing Muswellbrook Waste and Recycling Facility, facing east from the northern portion of the site.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**13 and 14**
	Title:	SITE PHOTOGRAPHS		

Photograph 15 - Showing Muswellbrook Waste and Recycling Facility, facing north from the southern portion of the site.

Qualtest LABORATORY (NSW) PTY LTD	Client:	MUSWELLBROOK SHIRE COUNCIL	Project No:	NEW22P-0092-AA
	Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Date:	2/06/22
	Location:	252 COAL ROAD, MUSWELLBROOK	No:	**15**
	Title:	SITE PHOTOGRAPHS		

APPENDIX F:

NSW EPA Records

MURWILLUMBAH SOUTH	Former Norco Butter Factory (Eastern Portion)	230 Tweed Valley WAY	Other Petroleum	Regulation under CLM Act not required	-28.32791359	153.4073052
MUSWELLBROOK	Former Caltex Depot	1 Lower William STREET	Other Petroleum	Regulation under CLM Act not required	-32.26614257	150.8865136
MUSWELLBROOK	Vacant Rail Land	27 Brook STREET	Unclassified	Regulation under CLM Act not required	-32.26346086	150.8873181
MUSWELLBROOK	United Branded (Former Mobil) Service Station Muswellbrook	49-51 Maitland STREET	Service Station	Regulation under CLM Act not required	-32.27218162	150.8900206
MUSWELLBROOK	Former Mobil Depot Muswellbrook	43-51 Ford STREET	Other Petroleum	Regulation under CLM Act not required	-32.2599725	150.887573
MUSWELLBROOK	Woolworths Petrol	72 Brook STREET	Service Station	Regulation under CLM Act not required	-32.26325377	150.8905966
MUSWELLBROOK	Caltex Muswellbrook Service Station	84-86 Maitland STREET	Service Station	Regulation under CLM Act not required	-32.27793094	150.8980938
MUSWELLBROOK	Former Gasworks	Corner Carl Street and Foley STREET	Gasworks	Regulation under CLM Act not required	-32.26672337	150.8935982
MUSWELLBROOK	Bayswater Power Station	New England HIGHWAY	Other Industry	Regulation under CLM Act not required	-32.3954046	150.9502683
MUSWELLBROOK	Former Industrial Site	Lot 89 Rathmore STREET	Other Industry	Regulation under CLM Act not required	-32.30544071	150.8823657
MUSWELLBROOK	Caltex Service Station	12-16 Sydney STREET	Service Station	Regulation under CLM Act not required	-32.26785559	150.8879601
MUSWELLBROOK	Former Caltex Depot	47-50 Victoria STREET	Service Station	Regulation under CLM Act not required	-32.26788823	150.8930609

MUSWELLBROOK	Former Caltex Depot	47-50 Victoria STREET	Service Station	Regulation under CLM Act not required	-32.26788823	150.8930609

Suburb	SiteName	Address	ContaminationActivityType	ManagementClass	Latitude	Longitude
MUSWELLBROOK	Former Pit Top No. 1 Colliery Muswellbrook Coal	Corner Clendinning Street and Victoria STREET	Other Industry	Regulation under CLM Act not required	-32.27031992	150.9009981
NABIAC	Caltex Service Station Nabiac	3964 Wallanbah (Cnr Wallanbah Rd and Pacific Hwy) ROAD	Service Station	Regulation under CLM Act not required	-32.09864883	152.3754346
NAMBUCCA HEADS	Former Mobil Service Station	6 Bowra STREET	Service Station	Regulation under CLM Act not required	-30.64282123	153.0025894

Search results

Your search for: LGA: MUSWELLBROOK SHIRE COUNCIL

Search Again | Refine Search

did not find any records in our database.

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

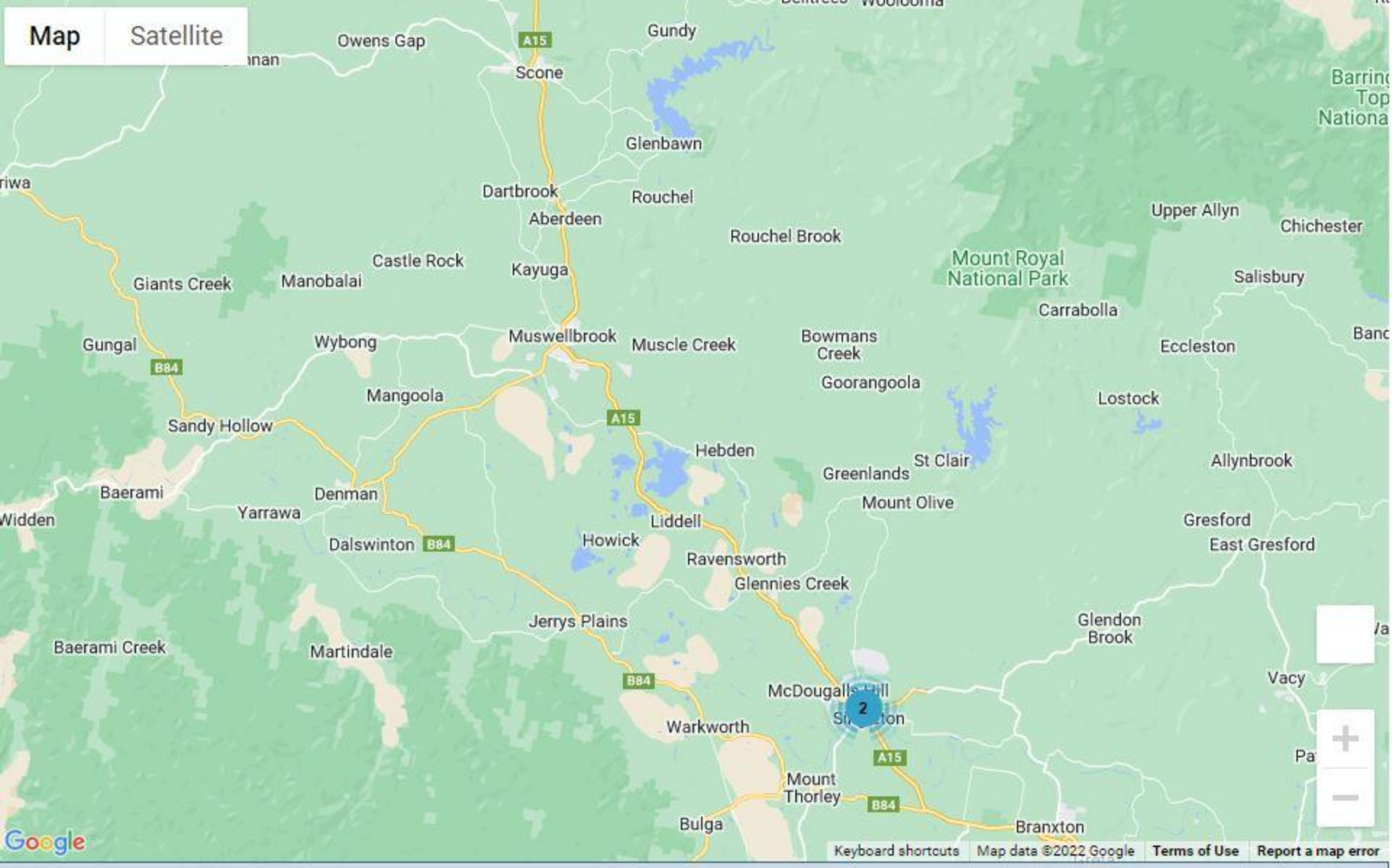
... more search tips

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.
This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register


Map
Satellite
Owens Gap
Scone
Gundy
A15
Glenbawn
Dartbrook
Rouchel
Aberdeen
Rouchel Brook
Upper Allyn
Chichester
Mount Royal National Park
Salisbury
Carrabolla
Castle Rock
Kayuga
Manobalai
Giants Creek
Gungal
B84
Wybong
Muswellbrook
Muscle Creek
Bowmans Creek
Eccleston
Goorangoola
Lostock
Mangoola
Sandy Hollow
Hebden
St Clair
Greenlands
Allynbrook
Baerami
Denman
Yarrawa
Mount Olive
Liddell
Gresford
Howick
East Gresford
Dalswinton
Ravensworth
Glennies Creek
Jerrys Plains
Glendon Brook
Baerami Creek
Martindale
Vacy
McDougalls Hill
Warkworth
Mount Thorley
Bulga
Branxton
2
Google
Keyboard shortcuts
Map data ©2022 Google
Terms of Use
Report a map error
PFAS investigation site
Multiple sites

Maitland City Council	Charles Street, Maitland	Search record of EPA notices
Maitland City Council	Melbourne Street, East Maitland	Search record of EPA notices
Manly Council	Stuart Street, Manly	Search record of EPA notices
Mudgee Shire Council	Mortimer Street, Mudgee	Contact council
Muswellbrook Shire Council	Carl Street, Muswellbrook	Contact council
Newcastle City Council	Clyde Street, Hamilton North	Search record of EPA notices
Newcaslte City Council	Ellis Road, Turton Road, Georgetown Road, Waratah	Contact council

Your search for: **POEO Licences** with the following criteria

Suburb - muswellbrook

returned 19 results

Export to excel

1 of 1 Pages

Search Again

Number	Name	Location	Type	Status	Issued date
779	AGL MACQUARIE PTY LIMITED	NEW ENGLAND HIGHWAY, MUSWELLBROOK, NSW 2333	POEO licence	Issued	20 Apr 2000
4885	AQC DARTBROOK MANAGEMENT PTY LTD	STAIR STREET, MUSWELLBROOK, NSW 2333	POEO licence	Issued	31 Jul 2000
11986	AUSGRID	41 Thomas Mitchell Drive, MUSWELLBROOK, NSW 2333	POEO licence	No longer in force	18 Aug 2004
6538	BENGALLA MINING COMPANY PTY LIMITED	BENGALLA ROAD VIA, MUSWELLBROOK, NSW 2333	POEO licence	Issued	25 Aug 2000
954	BORAL RESOURCES (COUNTRY) PTY. LIMITED	WALLARAH ROAD, MUSWELLBROOK, NSW 2333	POEO licence	No longer in force	22 Oct 1999
12301	GUCCI HOLDINGS PTY LTD	NEW ENGLAND HIGHWAY MUSWELLBROOK, MUSWELLBROOK, NSW 2333	POEO licence	Issued	15 Apr 2005
1926	HANSON CONSTRUCTION MATERIALS PTY LTD	LOT 30 CARRAMERE ROAD, MUSWELLBROOK, NSW 2333	POEO licence	No longer in force	25 May 2000
12828	HERMES RESOURCES PTY LTD	"Bimbadeen" McCullys Gap Road, MUSWELLBROOK, NSW 2333	POEO licence	Surrendered	11 Mar 2008
11345	HUNTER AND NEW ENGLAND AREA HEALTH SERVICE	BRENTWOOD STREET, MUSWELLBROOK, NSW 2333	POEO licence	No longer in force	26 Apr 2001
113	HUNTER VALLEY ENERGY COAL PTY LTD	THOMAS MITCHELL DRIVE, MUSWELLBROOK, NSW 2333	POEO licence	Surrendered	30 May 2000
11457	HUNTER VALLEY ENERGY COAL PTY LTD	THOMAS MITCHELL DRIVE, MUSWELLBROOK, NSW 2333	POEO licence	Issued	09 Oct 2001
11498	HUNTER VALLEY FILTER SALES PTY. LIMITED	Unit 5, 234 Industrial Close, MUSWELLBROOK, NSW 2333	POEO licence	Surrendered	02 Nov 2001
20850	MACH ENERGY AUSTRALIA PTY LTD	1100 WYBONG ROAD, MUSWELLBROOK, NSW 2333	POEO licence	Issued	24 Nov 2016
1323	MAXWELL VENTURES (MANAGEMENT) PTY LTD	THOMAS MITCHELL DRIVE, MUSWELLBROOK, NSW 2333	POEO licence	Issued	18 Sep 2000
656	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	POEO licence	Issued	11 Sep 2000
1593	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	POEO licence	Issued	10 Aug 2000
5980	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	POEO licence	Issued	22 Sep 2000
13410	PATRICK WILD	LOT 354 UPPER HEBDEN ROAD, MUSWELLBROOK, NSW 2333	POEO licence	Issued	02 Aug 2011
11677	UPPER HUNTER COUNTY COUNCIL	NEW ENGLAND HIGHWAY, MUSWELLBROOK, NSW 2333	POEO licence	Surrendered	21 Jun 2002

1003032	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	05 Dec 2000
1013330	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	07 Dec 2001
1017830	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	02 Jun 2003
1038787	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	12 Aug 2004
1042380	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	23 Dec 2004
1045160	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	07 Mar 2005
1047505	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	12 May 2005
1089933	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	06 Aug 2008
1104191	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	17 Nov 2009
1501470	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	02 Dec 2011
1510495	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	21 Mar 2013
1516260	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	05 Sep 2013
1522371	MUSWELLBROOK COAL COMPANY LTD	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	16 Oct 2014

12345678910...

1003017	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	07 Dec 2000
1010477	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	26 Sep 2001
1013357	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	26 Jun 2002
1027776	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	26 Jun 2003
1028822	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	28 Aug 2003
1031291	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	19 Feb 2004
1047692	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	04 Jan 2006
1061985	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	24 Aug 2006
1069214	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	29 Mar 2007
1075834	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	09 Nov 2007
1084659	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	26 Jun 2008
1095168	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	20 Feb 2009
1098514	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	04 Jun 2009

Export to excel

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Search Again

Number	Name	Location	Type	Status	Issued date
1102884	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	23 Jun 2009
1119470	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	15 Nov 2010
1511021	MUSWELLBROOK SHIRE COUNCIL	30 SKELLATAR STOCK ROUTE, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	02 Jan 2013
1534225	MUSWELLBROOK SHIRE COUNCIL	COAL ROAD, MUSWELLBROOK, NSW 2333	s.58 Licence Variation	Issued	29 Jan 2016

APPENDIX G:

Section 10.7 Certificate

PLANNING CERTIFICATE UNDER SECTION 10.7 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Planning
Contact	02 6549 3700
Receipt no.	1422883
Your reference	252 Coal Road Muswellbrook

Date: 15 June 2022

Assessment: 75952 **Cert No: 23076**

QUALTEST
2 Murray Dwyer Circuit
Mayfield West NSW 2304

Owner (as recorded by Council)

Muswellbrook Shire Council

Property Description: 252 Coal Road MUSWELLBROOK 2333
LOT: 1 DP: 819014

Land to which the certificate relates

The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 10.7(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

1. NAMES OF RELEVANT PLANNING INSTRUMENTS AND DEVELOPMENT CONTROL PLANS

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:

SEPP (Biodiversity and Conservation) 2021 – This SEPP contains:

- Planning rules and controls for the clearing of native vegetation in NSW on land zoned for urban and environmental purposes that is not linked to a development application.
- The land use planning and assessment framework for koala habitat.

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure consistent approach to minimizing water and energy use in new dwellings.

SEPP (Exempt and Complying Development Codes) 2008 – The policy provides exempt and complying codes that have State-wide application, identifying types of development that are of minimal environmental impact.

SEPP No. 65 (Design Quality of Residential Flat Development) – Aims to raise the design quality of residential flat development through the application of a series of design principles.

SEPP (Housing) 2021 - The principles of this Policy are to enable the development of diverse housing types, including affordable housing and purpose-built rental housing, reinforce the importance of designing housing for climate, hazards and to reflect the locality it is being built in, and to mitigate the loss of affordable rental housing.

SEPP (Industry and Employment) 2021 – This SEPP contains planning provisions for advertising signage in NSW.

Date: 16 June 2022

Cert No: 23076

SEPP (Planning Systems) 2021 – This SEPP:

- Identifies State or Regionally significant development, State significant infrastructure, and critical State significant infrastructure.
- Provides consideration of development delivery plans by local Aboriginal land councils in planning assessment.
- Allows the Planning Secretary to elect to be the concurrence authority for certain development that requires concurrence under nominated Staten Environmental planning policies.

SEPP (Precincts - Regional) 2021 – This SEPP contains planning provisions for precinct planning, which is a form of strategic planning applied to a specified geographic area. The precincts in this SEPP are located outside the Greater Sydney Region Plan.

SEPP (Primary Production) 2021 – This SEPP contains planning provisions:

- To manage primary production and rural development including supporting sustainable agriculture.
- For the protection of prime agricultural land of state and regional significance as well as regionally significant mining and extractive resources.

SEPP (Resilience and Hazards) 2021 – This SEPP contains planning provisions:

- To manage hazardous and offensive development.
- To provide a state-wide planning framework for the remediation of contaminated land and to minimise the risk of harm.

SEPP (Resources and Energy) 2021 – This SEPP contains planning provisions:

- For the assessment and development of mining, petroleum production and extractive material resource proposals in NSW.
- To facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area by identifying land which contains extractive material of regional significance.

SEPP (Transport and Infrastructure) 2021 – This SEPP contains planning provisions:

- For infrastructure in NSW, such as hospitals, roads, railways, emergency services, water supply and electricity delivery.
- For child-care centres, schools, TAFEs and Universities.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

Hunter Regional Plan 2036
Upper Hunter Strategic Land Use Regional Plan 2012

LOCAL PLANNING INSTRUMENTS

The provisions of Muswellbrook Local Environmental Plan 2009 apply to this land.

Date: 16 June 2022

Cert No: 23076

Public exhibition for Employment Zones Reform

The Department of Planning and Environment (DPE) is currently exhibiting the translation of existing Business and Industrial zones into the new Employment zones. To view the detail and make a submission please go to https://www.planningportal.nsw.gov.au/employment-zones.

DEVELOPMENT CONTROL PLANS

The provisions of Muswellbrook Development Control Plan 2009 apply to this land.

2. ZONING AND LAND USE

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	SP2 Infrastructure

PERMITTED WITHOUT CONSENT

Nil

PERMITTED WITH CONSENT

Aquaculture; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose; Roads

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan, 2009 the erection of a dwelling house on the land within zones: B2, B5, IN1, IN2, SP2, RE1, RE2, RU3, C1, W1 is PROHIBITED, with the exception of dwelling houses permitted under 'existing use' provisions of the EP&A Act 1979. A person seeking to rely on existing use provisions should obtain advice from a planning consultant or planning law expert.

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size IS NOT TO BE LESS than 600m2.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not within a conservation area.

Date: 16 June 2022

Cert No: 23076

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

3. CONTRIBUTION PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

4. COMPLYING DEVELOPMENT

CERTIFICATE UNDER SECTION 10.7(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 4 OF SCHEDULE 2 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

Not applicable to the land to which this certificate relates.

Part 4 Housing Alterations Code

Not applicable to the land to which this certificate relates.

Part 4A General Development Code

Not applicable to the land to which this certificate relates.

Part 5 Commercial and Industrial Alterations Code

YES. Complying development specified in the Commercial and Industrial Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Date: 16 June 2022

Cert No: 23076

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

5. EXEMPT DEVELOPMENT

The land is land on which exempt development may be carried out under the exempt development codes under SEPP (Exempt and Complying Development Codes) 2008.

6. AFFECTED BUILDING NOTICES AND BUILDING PRODUCT RECTIFICATION ORDERS

(a) There are NO building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with, and

(b) There are NO notice of intention to make a building product rectification order of which the council is aware has been given in respect of the land and is outstanding.

7. LAND RESERVED FOR ACQUISITION

There are NO environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

8. ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

9. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The land is not categorised as Flood Prone land under an adopted flood study. Development on the land or part of the land may still be subject to flood related development controls if there is a waterway on the land. See Section 13 of Muswellbrook DCP 2009 for more information.

10. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land **IS** affected by a policy adopted by the council, or adopted by any other public authority that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding). Muswellbrook DCP 2009 contains requirements for new development to consider the issues of **potentially contaminated land,** and land use buffers to premises that may emit odours.

11. BUSH FIRE PRONE LAND

Rural Fires Act 1997. This land is designated as bush fire prone land and any development of the land will require appropriate fire protection assessment. For further information concerning the bush fire status of the land, please contact Council on (02) 6549 3700.

Date: 16 June 2022

Cert No: 23076

12. LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

13. MINE SUBSIDENCE

The land IS WITHIN a declared Mine Subsidence District under section 20 of the Coal Mine Subsidence Compensation Act 2017. Development in a Mine Subsidence District requires approval from Subsidence Advisory NSW. Subsidence Advisory NSW provides compensation to property owners for mine subsidence damage. To be eligible for compensation, development must be constructed in accordance with Subsidence Advisory NSW approval. Subsidence Advisory NSW has set surface development guidelines for properties in Mine Subsidence Districts that specify building requirements to help prevent potential damage from coal mine subsidence.

The land IS WITHIN a declared Mine Subsidence District under section 20 of the Coal Mine Subsidence Compensation Act 2017. Development in a Mine Subsidence District requires approval from Subsidence Advisory NSW. Subsidence Advisory NSW provides compensation to property owners for mine subsidence damage. To be eligible for compensation, development must be constructed in accordance with Subsidence Advisory NSW approval. The Department of Mineral Resources has identified the lands may be subject to coal mining (either open cut mining or underground mining). Further enquiries should be directed to the Department of Mineral Resources.

14. PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

15. PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

16. BIODIVERSITY STEWARDSHIP SITES

Council has NOT been notified that the land is a biodiversity stewardship site under a biodiversity stewardship agreement under the Biodiversity Conservation Act 2016.

17. BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified under the Biodiversity Conservation Act 2016.

18. ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

19. ANNUAL CHARGES UNDER THE LOCAL GOVERNMENT ACT 1993 FOR COASTAL PROTECTION SERVICES

The Coastal Management Act 2016 DOES NOT apply to this council area.

Date: 16 June 2022

Cert No: 23076

20. WESTERN SYDNEY AEROTROPOLIS

State Environmental Planning Policy (Precincts – Western Parkland City) 2021 DOES NOT apply to this council area.

21. DEVELOPMENT CONSENT CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

22. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 10.7(5) OF THE ACT

Activities that may have created potential contamination are known to have been carried out on the land:

Waste storage and treatment

For further information, please contact
Planning, Environment & Regulatory Services
on (02) 6549 3700.

F Plesman
General Manager

Per: _____

APPENDIX H:

Logs and Calibration Records

ENGINEERING LOG - BOREHOLE

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: BH01
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m				SM	TOPSOIL: Gravelly Silty SAND - fine to coarse grained, grey-brown, fines of low plasticity, fine to coarse grained angular gravel.					TOPSOIL
							0.15m	D - M				
						SM	Gravelly Silty SAND - fine to coarse grained, grey, fines of low plasticity, fine to coarse grained, angular gravel.					SLOPE WASH / POSSIBLE FILL
		0.40m					0.35m					
		E 0.50m		0.5		CH	CLAY - medium to high plasticity, pale grey, with pale orange, trace silt.		VSt	HP	300	RESIDUAL SOIL
							0.60m			HP	390	
							Silty CLAY - medium plasticity, pale grey to white, trace pale brown, with some fine to medium grained angular gravel, with some fine to coarse grained sand.			HP	220	
				1.0				$M > w_P$				
						Cl			VSt / Fb			
				1.5								
							1.70m					
							Silty Gravelly CLAY / Clayey GRAVEL - medium plasticity, pale grey to white, trace pale brown, fine to medium grained angular gravel.					RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				2.0		Cl						
							2.10m					
							Extremely weathered Siltstone with soil properties: breaks down into Silty Gravelly CLAY / Clayey GRAVEL - medium plasticity, pale grey to white, trace pale brown, fine to medium grained angular gravel, with highly weathered rock pockets.	$M < w_P$	H			EXTREMELY TO HIGHLY WEATHERED ROCK
				2.5		Cl						
							2.60m					
							Hole Terminated at 2.60 m					

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

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: BH02
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m				GP	FILL: Sandy GRAVEL - fine to coarse grained angular to sub-rounded, grey, fine to coarse grained sand, trace fines of low plasticity.	M				FILL
							0.15m SILTSTONE - pale grey to grey, trace orange, estimated medium to high strength.	D				MODERATELY WEATHERED ROCK
							0.30m Hole Terminated at 0.30 m Refusal					

0.5
1.0
1.5
2.0
2.5

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

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: BH03
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m				GP	FILL: Sandy GRAVEL - fine to medium grained angular to sub-angular, grey to dark grey, with some brown to pale grey, trace black, fine to coarse grained sand, trace fines of low plasticity.	D - M				FILL
		0.40m										
		E 0.50m		0.5			0.50m					
						SM	FILL: Silty SAND - fine grained, dark grey to black, fines of low plasticity.	M				
		0.90m										
		E 1.00m		1.0			Grey to dark grey.					
				1.5			Dark grey to black.					
		1.70m					1.70m					
		E 1.80m				GP	Sandy GRAVEL - fine to medium grained angular, pale brown with some pale grey, fine to coarse grained, with some fines of low plasticity.	D - M	MD			RESIDUAL SOIL
				2.0								
				2.5			2.60m					
							Hole Terminated at 2.60 m					

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

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: BH04
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m				GP	0.10m FILL: Sandy GRAVEL - fine to medium grained angular, dark grey-brown, fine to coarse grained sand, trace fines of low plasticity.					FILL
		0.40m				GP	FILL: Sandy GRAVEL - fine to medium grained, angular, grey, pale brown to brown, trace orange, with fines of low plasticity. Trace coal chitter between 0.15 to 0.18m.	D - M				
		E 0.50m		0.5			0.55m					
		0.60m				CH	0.60m CLAY - medium to high plasticity, pale grey, with pale orange.	M > W_P	VSt	HP	320	RESIDUAL SOIL
		E 0.70m					Extremely weathered Sandy Siltstone with soil properties: breaks down into Silty Sandy GRAVEL - fine to medium grained angular, pale brown, trace pale grey, fine to coarse grained sand, fines of low plasticity.					EXTREMELY WEATHERED ROCK
				1.0			Sandy CLAY band - approximately 100mm thick. Assessed to be of Hard consistency.			HP	420	
				1.5		GM		D - M	D			
				2.0			Silty CLAY band - approximately 200mm thick. Assessed to be of Hard consistency.			HP	>600	
				2.5			2.60m					
							Hole Terminated at 2.60 m					

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

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: BH05
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m				CL	0.10m FILL-TOPSOIL: Sandy CLAY - low plasticity, dark grey to dark brown, fine to coarse grained sand, trace fine to medium grained gravel, root affected.	M < w_P				FILL: TOPSOIL
		0.40m				GM	FILL: Silty Sandy GRAVEL - fine to coarse grained angular to sub-angular, grey to pale brown, with dark grey, trace orange to red-brown, fine to coarse grained sand, fines of low plasticity.	D - M				FILL
		E 0.50m		0.5								
		0.60m					0.60m					
		E 0.70m				CH	CLAY - medium to high plasticity, pale grey, with pale brown, trace red-brown.	M > w_P	VSt	HP	300	RESIDUAL SOIL
										HP	400	
				1.0			Trace extremely weathered rock pockets.	M < w_P	H	HP	450	
							1.20m					
						GM	Extremely weathered Sandy Siltstone with soil properties: breaks down into Silty Sandy GRAVEL - fine to medium grained angular, pale brown, trace pale grey, fine to coarse grained sand, fines of low plasticity.	D - M	D			EXTREMELY WEATHERED ROCK
				1.5			1.50m					
							Sandy SILTSTONE - pale grey, with pale brown, fine grained sand in rock matrix, estimated low to high (generally of low to medium) rock strength.	D				HIGHLY TO MODERATELY WEATHERED ROCK
							1.70m					
							Hole Terminated at 1.70 m Refusal					
				2.0								
				2.5								

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

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: BH06
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m 0.20m E 0.30m		0.5		CL CH GC	0.10m TOPSOIL: Sandy CLAY - low plasticity, brown, fine grained sand, trace fine grained sub-rounded gravel, root affected. CLAY - medium to high plasticity, brown. 0.30m Clayey GRAVEL - fine to medium grained angular, brown, with pale grey and pale orange, fines of medium plasticity. 0.50m 0.55m Sandy SILTSTONE - fine grained sand in rock matrix, pale grey, with pale brown, estimated medium to high rock strength. Hole Terminated at 0.55 m Refusal	M < w_P M D	H D	HP	>600	TOPSOIL RESIDUAL SOIL HIGHLY TO MODERATELY WEATHERED ROCK

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

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: BH07
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m				CL	0.05m FILL-TOPSOIL: Sandy CLAY - low plasticity, brown, fine to coarse grained sand, trace fine to medium grained angular to sub-angular gravel, root affected.	M > w_P		HP	350	FILL: TOPSOIL FILL
						CH	FILL: Gravelly CLAY - medium to high plasticity, red-brown, fine to medium grained angular to sub-angular gravel, trace fine to coarse grained sand.			HP	>600	
		0.50m E 0.60m		0.5			Dark grey. Brown, with pale brown to pale grey.	M < w_P		HP	>600	
							0.65m Hole Terminated at 0.65 m Refusal on possible weathered rock.					
				1.0								
				1.5								
				2.0								
				2.5								

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: MUSWELLBROOK SHIRE COUNCIL
PAGE: 1 OF 1

PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
JOB NO: NEW22P-0092

LOCATION: COAL ROAD, MUSWELLBROOK
LOGGED BY: BE

DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m		0.5		GM	FILL: Silty SANDY GRAVEL - fine to coarse grained angular, dark grey to dark brown, fine grained sand, fines of low plasticity, trace angular cobbles.	M				FILL
		0.90m E 1.00m		1.0								
		1.70m E 1.80m		1.5			1.70m Sandy SILTSTONE - fine grained sand in rock matrix, pale grey, with pale brown, estimated medium to high rock strength. 1.80m	D				HIGHLY TO MODERATELY WEATHERED ROCK
				2.0			Hole Terminated at 1.80 m Refusal					
				2.5								

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

Qualtest LABORATORY (NSW) PTY LTD

CLIENT: MUSWELLBROOK SHIRE COUNCIL
PROJECT: COMMUNITY INFRASTRUCTURE DEPOT
LOCATION: COAL ROAD, MUSWELLBROOK

BOREHOLE NO: **BH09**
PAGE: 1 OF 1
JOB NO: NEW22P-0092
LOGGED BY: BE
DATE: 18/5/22

DRILL TYPE: 2.7 TONNE EXCAVATOR WITH AUGER ATTACHMENT **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	Not Encountered	E 0.10m				GM	FILL: Silty SANDY GRAVEL - fine to coarse grained angular, dark grey to dark brown, fine grained sand, fines of low plasticity, trace angular cobbles.	D - M				FILL
		0.40m										
		E 0.50m		0.5								
				1.0								
		1.30m										
		E 1.40m					1.40m					
				1.5			Hole Terminated at 1.40 m Refusal on possible weathered rock.					
				2.0								
				2.5								

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 I:

Analytical Results Tables

Muswellbrook Shire Council
NEW22P-0092

Table 1 - Soil Analytical Results
252 Coal Road, Muswellbrook

Qualtest LABORATORY (NSW) PTY LTD

							Field ID	BH01 0.0-0.1	BH01 0.4-0.5	BH02 0.0-0.1	BH03 0.0-0.1	BH03 0.9-1.0	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	BH09 0.4-0.5	S1	S3	S4
							Date	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022	18/05/2022
Analytes		**Units**	**LOR**	**HIL D [1]**	**HSL D [2]**	**EIL/ESL D [3]**	**Mgmt Limits [4]**														
Metals	Arsenic	mg/kg	2	3000		160		5.7	5.5	5.3	8.6	4.8	4.1	8.5	30	6.4	6.6	150	4	24	3.8	3.6
	Cadmium	mg/kg	0.4	900				< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Chromium	mg/kg	5	3600		530*		37	42	30	19	30	23	36	31	47	31	34	29	50	38	37
	Copper	mg/kg	5	240000		340*		21	14	31	11	25	13	12	6.7	15	30	23	22	8.8	45	41
	Lead	mg/kg	5	1500		1800		10	9.8	11	9.4	11	7.5	15	19	10	13	13	8.4	11	17	14
	Mercury	mg/kg	5	730				< 0.1	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1	0.6	0.3	0.2	< 0.1	0.1	0.1
	Nickel	mg/kg	5	6000		610*		27	19	26	9.5	39	15	14	31	29	12	16	19	12	12	26
	Zinc	mg/kg	5	400000		1100*		28	11	34	12	14	43	40	53	30	18	25	23	12	14	27
PAHs	Benzo(a)pyrene	mg/kg	0.5			0.7		< 0.5	-	< 0.5	-	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	-	-
	Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.6	40				0.6	-	0.6	-	-	0.6	0.6	-	0.6	-	0.6	-	0.6	-	-
	Naphthalene	mg/kg	0.5	NL		370		< 0.5	-	< 0.5	-	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	-	-
	Total PAH	mg/kg	0.5	4000				< 0.5	-	2.4	-	-	2.5	0.5	-	< 0.5	-	< 0.5	-	< 0.5	-	-
BTEX	Benzene	mg/kg	0.1		3	75		< 0.1	-	< 0.1	-	-	< 0.1	< 0.1	-	< 0.1	-	< 0.1	-	< 0.1	-	-
	Toluene	mg/kg	0.1		NL	135		< 0.1	-	< 0.1	-	-	< 0.1	< 0.1	-	< 0.1	-	< 0.1	-	< 0.1	-	-
	Ethylbenzene	mg/kg	0.1		NL	165		< 0.1	-	< 0.1	-	-	< 0.1	< 0.1	-	< 0.1	-	< 0.1	-	< 0.1	-	-
	Xylenes - Total	mg/kg	0.3		230	180		< 0.3	-	< 0.3	-	-	< 0.3	< 0.3	-	< 0.3	-	0.3	-	< 0.3	-	-
TRH	Naphthalene	mg/kg	0.5		NL	370		< 0.5	-	< 0.5	-	-	< 0.5	< 0.5	-	< 0.5	-	< 0.5	-	< 0.5	-	-
	TRH C6-C10	mg/kg	20			215	700	< 20	-	< 20	-	-	< 20	< 20	-	< 20	-	< 20	-	< 20	-	-
	TRH C6-C10 less BTEX (F1)	mg/kg	20		260			< 20	-	< 20	-	-	< 20	< 20	-	< 20	-	< 20	-	< 20	-	-
	TRH >C10-C16	mg/kg	50			170	5200	< 50	-	65	-	-	< 500	< 50	-	< 50	-	< 50	-	< 50	-	-
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50		NL			< 50	-	65	-	-	< 500	< 50	-	< 50	-	< 50	-	< 50	-	-
	TRH >C16-C34	mg/kg	100			2500	10000	220	-	280	-	-	< 1000	260	-	< 100	-	< 100	-	< 100	-	-
	TRH >C34-C40	mg/kg	100			6600	10000	< 100	-	< 100	-	-	< 1000	< 100	-	< 100	-	< 100	-	< 100	-	-
OCPs	DDT+DDE+DDD	mg/kg	0.1	3600				< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	DDT	mg/kg	0.1			640		< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	Aldrin & Dieldrin	mg/kg	0.1	45				< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	Total Chlordane	mg/kg	0.1	530				< 0.1	-	-	-	-	-	-	-	< 0.1	-	-	-	< 0.1	-	-
	Total Endosulfan	mg/kg	0.1	2000				< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	Endrin	mg/kg	0.1	100				< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	Heptachlor	mg/kg	0.1	50				< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	HCB	mg/kg	0.1	80				< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	Methoxychlor	mg/kg	0.1	2500				< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-
	Total OCP	mg/kg	0.1					< 0.1	-	-	-	-	-	-	-	< 0.1	-	-	-	< 0.1	-	-
OPP	Chlorpyriphos	mg/kg	0.1	2000				< 0.2	-	-	-	-	-	-	-	< 0.2	-	-	-	< 0.2	-	-
	Total OPP	mg/kg	0.1					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	ACM	DETECTED			0.05			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes

* EIL based on average of two pH & CEC results, pH avergae of 6.6, CEC average of 30.5mg/kg, and Clay content 5%, and using Ambient Background Concentration obtained from Olszowy et al (1995) using urban soils, old suburbs with high traffic, 25%

ND Not detected

NL Not limiting

Result Concentration exceeds adopted health investigation level (Commercial/Industrial)

Result Concentration exceeds adopted health screening level, vapour intrusion (Commercial/Industrial, Sand, 0-1m)

Result Concentration exceeds the adopted ecological investigation/screening levels

Result Concentration exceeds adopted management limit

1 NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Table 1A(1): Health Investigation Levels

2 NEPC (2013) Soil Health Screening Levels for Vapour Intrusion, Commercial/Industrial, Clay 0m to <1m

3 NEPC (2013) Soil Ecological Investigation & Screening Levels, commercial/industrial

4 NEPC (2013) Management Limits for TPH Fractions F1-F4 in Soil, adjusted as described in report

Muswellbrook Shire Council
NEW22P-0092

Table 1 - Soil Analytical Results
252 Coal Road, Muswellbrook

Qualtest LABORATORY (NSW) PTY LTD

							Field ID	SS1	SS3	SS4	SS5
							Date	18/05/2022	18/05/2022	18/05/2022	18/05/2022
Analytes		**Units**	**LOR**	**HIL D [1]**	**HSL D [2]**	**EIL/ESL D [3]**	**Mgmt Limits [4]**				
Metals	Arsenic	mg/kg	2	3000		160		3.3	4.7	6.6	6.1
	Cadmium	mg/kg	0.4	900				< 0.4	< 0.4	< 0.4	< 0.4
	Chromium	mg/kg	5	3600		530*		22	21	29	52
	Copper	mg/kg	5	240000		340*		19	18	51	15
	Lead	mg/kg	5	1500		1800		10	12	16	11
	Mercury	mg/kg	5	730				0.4	< 0.1	0.3	< 0.1
	Nickel	mg/kg	5	6000		610*		14	20	20	25
	Zinc	mg/kg	5	400000		1100*		28	58	21	26
PAHs	Benzo(a)pyrene	mg/kg	0.5			0.7		< 0.5	-	-	-
	Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.6	40				0.6	-	-	-
	Naphthalene	mg/kg	0.5	NL		370		< 0.5	-	-	-
	Total PAH	mg/kg	0.5	4000				< 0.5	-	-	-
BTEX	Benzene	mg/kg	0.1		3	75		< 0.1	-	-	-
	Toluene	mg/kg	0.1		NL	135		< 0.1	-	-	-
	Ethylbenzene	mg/kg	0.1		NL	165		< 0.1	-	-	-
	Xylenes - Total	mg/kg	0.3		230	180		< 0.3	-	-	-
TRH	Naphthalene	mg/kg	0.5		NL	370		< 0.5	-	-	-
	TRH C6-C10	mg/kg	20			215	700	< 20	-	-	-
	TRH C6-C10 less BTEX (F1)	mg/kg	20		260			< 20	-	-	-
	TRH >C10-C16	mg/kg	50			170	5200	< 50	-	-	-
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50		NL			< 50	-	-	-
	TRH >C16-C34	mg/kg	100			2500	10000	210	-	-	-
	TRH >C34-C40	mg/kg	100			6600	10000	< 100	-	-	-
OCPs	DDT+DDE+DDD	mg/kg	0.1	3600				-	-	-	-
	DDT	mg/kg	0.1			640		-	-	-	-
	Aldrin & Dieldrin	mg/kg	0.1	45				-	-	-	-
	Total Chlordane	mg/kg	0.1	530				-	-	-	-
	Total Endosulfan	mg/kg	0.1	2000				-	-	-	-
	Endrin	mg/kg	0.1	100				-	-	-	-
	Heptachlor	mg/kg	0.1	50				-	-	-	-
	HCB	mg/kg	0.1	80				-	-	-	-
	Methoxychlor	mg/kg	0.1	2500				-	-	-	-
	Total OCP	mg/kg	0.1					-	-	-	-
OPP	Chlorpyriphos	mg/kg	0.1	2000				-	-	-	-
	Total OPP	mg/kg	0.1					-	-	-	-
Asbestos	ACM	DETECTED			0.05			ND	ND	ND	ND

Notes

* EIL based on average of two pH & CEC results, pH avergae of 6.6, CEC average of 30.5mg/kg, and Clay content 5%, and using Ambient Background Concentration obtained from Olszowy et al (1995) using urban soils, old suburbs with high traffic, 25%

ND Not detected

NL Not limiting

Result Concentration exceeds adopted health investigation level (Commercial/Industrial)

Result Concentration exceeds adopted health screening level, vapour intrusion (Commercial/Industrial, Sand, 0-1m)

Result Concentration exceeds the adopted ecological investigation/screening levels

Result Concentration exceeds adopted management limit

1 NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Table 1A(1): Health Investigation Levels

2 NEPC (2013) Soil Health Screening Levels for Vapour Intrusion, Commercial/Industrial, Clay 0m to <1m

3 NEPC (2013) Soil Ecological Investigation & Screening Levels, commercial/industrial

4 NEPC (2013) Management Limits for TPH Fractions F1-F4 in Soil, adjusted as described in report

Table 2 - Quality Control Results
252 Coal Road, Muswellbrook

		Sample ID		BH01 0.0-0.1	D.18.5.22	RPD %	BH01 0.0-0.1	T.28.4.22	RPD %
		Date		18/05/2022	18/05/2022		18/05/2022	18/05/2022	
		Type		Primary	Duplicate		Primary	Triplicate	
Analytes		**Soil Units**	**LOR**						
Metals	Arsenic	mg/kg	2	5.7	12	71	5.7	7	20
	Cadmium	mg/kg	0.4	< 0.4	< 0.4	0	< 0.4	< 1	0
	Chromium	mg/kg	5	37	28	28	37	39	5
	Copper	mg/kg	5	21	15	33	21	23	9
	Lead	mg/kg	5	10	10	0	10	9	11
	Mercury	mg/kg	5	< 0.1	< 0.1	0	< 0.1	< 0.1	0
	Nickel	mg/kg	5	27	26	4	27	28	4
	Zinc	mg/kg	5	28	27	4	28	36	25
PAHs	Acenaphthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Acenaphthylene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Anthracene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benz(a)anthracene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(a)pyrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(b&j)fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(g.h.i)perylene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Chrysene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Dibenz(a.h)anthracene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Fluoranthene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Fluorene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Indeno(1.2.3-cd)pyrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Naphthalene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Phenanthrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Pyrene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
	Total PAH	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 0.5	0
BTEX	Benzene	mg/kg	0.1	< 0.1	< 0.1	0	< 0.1	< 0.2	0
	Toluene	mg/kg	0.1	< 0.1	< 0.1	0	< 0.1	< 0.5	0
	Ethylbenzene	mg/kg	0.1	< 0.1	< 0.1	0	< 0.1	< 0.5	0
	Xylenes - Total	mg/kg	0.3	< 0.3	< 0.3	0	< 0.3	< 0.5	0
TRH	Naphthalene	mg/kg	0.5	< 0.5	< 0.5	0	< 0.5	< 1	0
	TRH C6-C10	mg/kg	20	< 20	< 20	0	< 20	< 10	0
	TRH C6-C10 less BTEX (F1)	mg/kg	20	< 20	< 20	0	< 20	< 10	0
	TRH >C10-C16	mg/kg	50	< 50	< 50	0	< 50	< 50	0
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50	< 50	< 50	0	< 50	< 50	0
	TRH >C16-C34	mg/kg	100	220	190	15	220	< 100	75
	TRH >C34-C40	mg/kg	100	< 100	< 100	0	< 100	< 100	0

*RPDs have only been considered where a concentration is greater than 10 times the EQL.
**High RPDs are in bold (Acceptable RPD range is 30% (>10 x EQL))

APPENDIX J:

Data Validation Report

QA/QC DATA VALIDATION REPORT
Job No: NEW22P-0092-AA

Eurofins report: 891062-S, 891062-AID
ALS reports: ES2218449_0_COA,

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	19
No. of Duplicates	1
No. of Triplicates	1
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 19 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).	Yes	-
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	Yes	-

in the samples and whether they are common laboratory chemicals).		

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	Laboratory duplicate RPDs were recorded within the control limits except for a range of metals (31-35%) and PAHs (40-52%) the laboratory quoted code Q15 which states "The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report. Based on this the laboratory RPDs are not considered to affect the data.
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 K:

Laboratory Reports

1/4

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
- ☐ **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
Address	2 Murray Dwyer Circuit Mayfield West NSW 2304
Contact Name	Libby Betz
Phone №	
Special Directions	
Purchase Order	
Quote ID №	180622QUAN-3
Project №	NEW22P-0092
Project Name	Nulkaba Projects Pty Ltd - Nulkaba
Project Manager	Libby Betz
EDD Format (ESdat, EQuIS etc)	Excel
Sampler(s)	B.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.
♦Surcharge will apply
- ☐ Overnight (reporting by 9am)♦
- ☐ Same day♦
- ☐ 1 day♦
- ☐ 2 days♦
- ☐ 3 days♦
- ☑ 5 days (Standard)
- ☐ Other( )

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	Metals	Asbestos (ID)	Metals	Suite B1 TRH, BTEX	OCPs/OPPs	pH and CEC	Suite B7 - TRH, BTEX, PAHs, Metals	Suite S26 - TRH, BTEX, PAHs, Metals	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	S1	18/05/22	Soil		X			X		X								1	1	
2	S2	18/05/22	Soil															1	1	
3	S3	18/05/22	Soil	X	X													1	1	
4	S4	18/05/22	Soil	X	X													1	1	
5	SS1	18/05/22	Soil		X					X								1	1	
6	SS2	18/05/22	Soil															1	1	
7	SS3	18/05/22	Soil	X	X													1	1	
8	SS4	18/05/22	Soil	X	X													1	1	
9	SS5	18/05/22	Soil	X	X													1	1	
10	BH01 0.0-0.1	18/05/22	Soil		X			X	X	X								1	1	
			Total Counts	5	8			2	1	3								10	10	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date		Time	

Laboratory Use Only								
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time		Temperature 5.0°C
Received By	CR	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date	23.5.22	Time	2.18pm	Report № 891062

Eurofins Environment Testing Australia Pty Ltd

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

☐ 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-0092	Project Manager	Libby Betz
Address	2 Murray Dwyer Circuit Mayfield West NSW 2304	Project Name	Nulkaba Projects Pty Ltd - Nulkaba	EDD Format (ESdat, EQuIS etc)	Excel
Contact Name	Libby Betz				
Phone №					
Special Directions					
Purchase Order					
Quote ID №	180622QUAN-3				

Sampler(s)	B.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.

♦Surcharge will apply

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

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	Metals	Asbestos ID	Metals	Suite B1 TRH, BTEX	OCPs/OPPs	pH and CEC	Suite B7 - TRH, BTEX, PAHs, Metals	Suite S26 - TRH, BTEX, PAHs, Metals											Sample Comments / Dangerous Goods Hazard Warning
																		500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	
1	BH01 0.4-0.5	18/05/22	Soil	X	X																			1		
2	BH02 0.0-0.1	18/05/22	Soil		X					X														1	1	
3	BH03 0.0-0.1	18/05/22	Soil	X	X																			1	1	
4	BH03 0.4-0.5	18/05/22	Soil																					1	1	
5	BH03 0.9-1.0	18/05/22	Soil	X	X																			1	1	
6	BH03 1.7-1.8	18/05/22	Soil																					1		
7	BH04 0.0-0.1	18/05/22	Soil		X					X														1	1	
8	BH04 0.4-0.5	18/05/22	Soil																					1	1	
9	BH04 0.6-0.7	18/05/22	Soil																					1		
10	BH05 0.0-0.1	18/05/22	Soil		X					X														1	1	
		Total Counts		3	6					3														10	7	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date		Time	

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	23.5.22	Time	2.18pm	Report №	891062

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.

3/4

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
- ☐ **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
Address	2 Murray Dwyer Circuit Mayfield West NSW 2304
Contact Name	Libby Betz
Phone №	
Special Directions	
Purchase Order	
Quote ID №	180622QUAN-3
Project №	NEW22P-0092
Project Name	Nulkaba Projects Pty Ltd - Nulkaba
Project Manager	Libby Betz
EDD Format (ESdat, EQuIS etc)	Excel
Sampler(s)	B.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. ♦Surcharge will apply

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

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	Metals	Asbestos (ID)	Metals	Suite B1 TRH, BTEX	OCPs/OPPs	pH and CEC	Suite B7 - TRH, BTEX, PAHs, Metals	Suite S26 - TRH, BTEX, PAHs, Metals	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	BH05 0.4-0.5	18/05/22	Soil															1	1	
2	BH05 0.6-0.7	18/05/22	Soil															1		
3	BH06 0.0-0.1	18/05/22	Soil	X	X													1	1	
4	BH06 0.2-0.3	18/05/22	Soil															1		
5	BH07 0.0-0.1	18/05/22	Soil		X			X		X								1	1	
6	BH07 0.5-0.6	18/05/22	Soil															1	1	
7	BH08 0.0-0.1	18/05/22	Soil	X	X													1	1	
8	BH08 0.9-1.0	18/05/22	Soil															1	1	
9	BH08 1.7-1.8	18/05/22	Soil															1	1	
10	BH09 0.0-0.1	18/05/22	Soil		X					X								1	1	
			Total Counts	2	4			1		2								10	8	

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal | Name | Signature | Date | Time

Laboratory Use Only					
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date	Time	Temperature
Received By	[signature]	SYD | BNE | MEL | PER | ADL | (NTL) | DRW	Signature [signature]	Date 23.5.22	Time 2:18pm	Report № 891062

Eurofins Environment Testing Australia Pty Ltd

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QS3003_R10 Modified by: Dr. R Symons Approved by: G. Jackson Approved on: 8 August 2019

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

☐ 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-0092	Project Manager	Libby Betz
Address	2 Murray Dwyer Circuit Mayfield West NSW 2304	Project Name	Nulkaba Projects Pty Ltd - Nulkaba	EDD Format (ESdat, EQuIS etc)	Excel
Contact Name	Libby Betz				
Phone №					
Special Directions					
Purchase Order					
Quote ID №	180622QUAN-3				

Sampler(s)	B.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.

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

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	Metals	Asbestos (ID	Metals	Suite B1 TRH, BTEX	OCPs/OPPs	pH and CEC	Suite B7 - TRH, BTEX, PAHs, Metals	Suite S26 - TRH, BTEX, PAHs, Metals	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	BH09 0.4-0.5	18/05/22	Soil	X	X				X									1	1	
2	BH09 1.3-1.4	18/05/22	Soil															1	1	
3	D.18.5.22	18/05/22	Soil							X								1		
4	T.18.5.22	18/05/22	Soil								X							1		Please send to ALS
5	D1.18.5.22	18/05/22	Soil															1		
6	T1 .18.5.22	18/05/22	Soil															1		
7																				
8																				
9																				
10																				
		Total Counts		1	1				1	1	1							6	2	

Method of Shipment	☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name		Signature		Date		Time	

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	23.5.22	Time	2.18pm	Report №	891062

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.

From: Billy Snow <BillySnow@qualtest.com.au>
Sent: Friday, 27 May 2022 2:09 PM
To: Quinn Raw <QuinnRaw@eurofins.com>
Subject: Report No. 891062

Hi Quinn,

Is it possible for me to get the site/project name for report 891062 changed from NULKABA PROJECTS PTY LTD – NULKABA to MSC – Muswellbrook?

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

eurofins | Environment Testing

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261 Site # 1254

Sydney
179 Magowar Road
Girraween NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 6253 4444
NATA # 2377 Site # 2370

Eurofins Environment Testing NZ Limited
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

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

Sample Receipt Advice

Company name:	Qualtest
Contact name:	Libby Betz
Project name:	MSC- MUSWELLBROOK
Project ID:	NEW22P-0092
Turnaround time:	5 Day
Date/Time received	May 23, 2022 2:18 PM
Eurofins reference	891062

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

BH04 0.6-0.7 mislabelled TP04 0.6-0.7. logged as per COC. Please advise if this is correct.

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 Libby Betz - libbybetz@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: **Libby Betz**

Report **891062-S**
Project name MSC- MUSWELLBROOK
Project ID NEW22P-0092
Received Date May 23, 2022

Client Sample ID			S1	S3	S4	SS1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056495	N22-My0056496	N22-My0056497	N22-My0056498
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 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	< 50	-	-	120
TRH C29-C36	50	mg/kg	< 50	-	-	120
TRH C10-C36 (Total)	50	mg/kg	< 50	-	-	240
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	%	93	-	-	84
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	< 0.5	-	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	1.2
Acenaphthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	< 0.5
Anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Chrysene	0.5	mg/kg	< 0.5	-	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Fluorene	0.5	mg/kg	< 0.5	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5

Client Sample ID			S1	S3	S4	SS1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056495	N22-My0056496	N22-My0056497	N22-My0056498
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.5	mg/kg	< 0.5	-	-	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	-	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	56	-	-	125
p-Terphenyl-d14 (surr.)	1	%	80	-	-	150
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-HCH	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-HCH	0.05	mg/kg	< 0.05	-	-	-
d-HCH	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-	-
Toxaphene	0.5	mg/kg	< 0.5	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	78	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	65	-	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Bolstar	0.2	mg/kg	< 0.2	-	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	-	-
Coumaphos	2	mg/kg	< 2	-	-	-
Demeton-S	0.2	mg/kg	< 0.2	-	-	-
Demeton-O	0.2	mg/kg	< 0.2	-	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-	-
Dichlorvos	0.2	mg/kg	< 0.2	-	-	-
Dimethoate	0.2	mg/kg	< 0.2	-	-	-
Disulfoton	0.2	mg/kg	< 0.2	-	-	-
EPN	0.2	mg/kg	< 0.2	-	-	-
Ethion	0.2	mg/kg	< 0.2	-	-	-

Client Sample ID			S1	S3	S4	SS1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056495	N22-My0056496	N22-My0056497	N22-My0056498
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Ethoprop	0.2	mg/kg	< 0.2	-	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	-	-	-
Fenitrothion	0.2	mg/kg	< 0.2	-	-	-
Fensulfothion	0.2	mg/kg	< 0.2	-	-	-
Fenthion	0.2	mg/kg	< 0.2	-	-	-
Malathion	0.2	mg/kg	< 0.2	-	-	-
Merphos	0.2	mg/kg	< 0.2	-	-	-
Methyl parathion	0.2	mg/kg	< 0.2	-	-	-
Mevinphos	0.2	mg/kg	< 0.2	-	-	-
Monocrotophos	2	mg/kg	< 2	-	-	-
Naled	0.2	mg/kg	< 0.2	-	-	-
Omethoate	2	mg/kg	< 2	-	-	-
Phorate	0.2	mg/kg	< 0.2	-	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Pyrazophos	0.2	mg/kg	< 0.2	-	-	-
Ronnel	0.2	mg/kg	< 0.2	-	-	-
Terbufos	0.2	mg/kg	< 0.2	-	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	-	-
Tokuthion	0.2	mg/kg	< 0.2	-	-	-
Trichloronate	0.2	mg/kg	< 0.2	-	-	-
Triphenylphosphate (surr.)	1	%	83	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	-	-	< 50
TRH >C16-C34	100	mg/kg	< 100	-	-	210
TRH >C34-C40	100	mg/kg	< 100	-	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	-	210
Heavy Metals						
Arsenic	2	mg/kg	24	3.8	3.6	3.3
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	50	38	37	22
Copper	5	mg/kg	8.8	45	41	19
Lead	5	mg/kg	11	17	14	10.0
Mercury	0.1	mg/kg	< 0.1	0.1	0.1	0.4
Nickel	5	mg/kg	12	12	26	14
Zinc	5	mg/kg	12	14	27	28
% Moisture	1	%	13	12	11	15

Client Sample ID			SS3	SS4	SS5	BH01 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056499	N22-My0056500	N22-My0056501	N22-My0056502
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	-	-	< 20
TRH C10-C14	20	mg/kg	-	-	-	22
TRH C15-C28	50	mg/kg	-	-	-	160
TRH C29-C36	50	mg/kg	-	-	-	< 50
TRH C10-C36 (Total)	50	mg/kg	-	-	-	182
BTEX						
Benzene	0.1	mg/kg	-	-	-	< 0.1
Toluene	0.1	mg/kg	-	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	-	< 0.2
o-Xylene	0.1	mg/kg	-	-	-	< 0.1
Xylenes - Total*	0.3	mg/kg	-	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	-	93
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	-	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	-	< 50
TRH C6-C10	20	mg/kg	-	-	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	-	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	-	1.2
Acenaphthene	0.5	mg/kg	-	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	-	< 0.5
Anthracene	0.5	mg/kg	-	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Chrysene	0.5	mg/kg	-	-	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	-	< 0.5
Fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Fluorene	0.5	mg/kg	-	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	-	< 0.5
Naphthalene	0.5	mg/kg	-	-	-	< 0.5
Phenanthrene	0.5	mg/kg	-	-	-	< 0.5
Pyrene	0.5	mg/kg	-	-	-	< 0.5
Total PAH*	0.5	mg/kg	-	-	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	-	-	80
p-Terphenyl-d14 (surr.)	1	%	-	-	-	91
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	-	-	< 0.1
4.4'-DDD	0.05	mg/kg	-	-	-	< 0.05
4.4'-DDE	0.05	mg/kg	-	-	-	< 0.05
4.4'-DDT	0.05	mg/kg	-	-	-	< 0.05
a-HCH	0.05	mg/kg	-	-	-	< 0.05
Aldrin	0.05	mg/kg	-	-	-	< 0.05

Client Sample ID			SS3	SS4	SS5	BH01 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056499	N22-My0056500	N22-My0056501	N22-My0056502
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
b-HCH	0.05	mg/kg	-	-	-	< 0.05
d-HCH	0.05	mg/kg	-	-	-	< 0.05
Dieldrin	0.05	mg/kg	-	-	-	< 0.05
Endosulfan I	0.05	mg/kg	-	-	-	< 0.05
Endosulfan II	0.05	mg/kg	-	-	-	< 0.05
Endosulfan sulphate	0.05	mg/kg	-	-	-	< 0.05
Endrin	0.05	mg/kg	-	-	-	< 0.05
Endrin aldehyde	0.05	mg/kg	-	-	-	< 0.05
Endrin ketone	0.05	mg/kg	-	-	-	< 0.05
g-HCH (Lindane)	0.05	mg/kg	-	-	-	< 0.05
Heptachlor	0.05	mg/kg	-	-	-	< 0.05
Heptachlor epoxide	0.05	mg/kg	-	-	-	< 0.05
Hexachlorobenzene	0.05	mg/kg	-	-	-	< 0.05
Methoxychlor	0.05	mg/kg	-	-	-	< 0.05
Toxaphene	0.5	mg/kg	-	-	-	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	-	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	-	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	-	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	-	-	-	90
Tetrachloro-m-xylene (surr.)	1	%	-	-	-	89
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	-	-	< 0.2
Bolstar	0.2	mg/kg	-	-	-	< 0.2
Chlorfenvinphos	0.2	mg/kg	-	-	-	< 0.2
Chlorpyrifos	0.2	mg/kg	-	-	-	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	-	-	-	< 0.2
Coumaphos	2	mg/kg	-	-	-	< 2
Demeton-S	0.2	mg/kg	-	-	-	< 0.2
Demeton-O	0.2	mg/kg	-	-	-	< 0.2
Diazinon	0.2	mg/kg	-	-	-	< 0.2
Dichlorvos	0.2	mg/kg	-	-	-	< 0.2
Dimethoate	0.2	mg/kg	-	-	-	< 0.2
Disulfoton	0.2	mg/kg	-	-	-	< 0.2
EPN	0.2	mg/kg	-	-	-	< 0.2
Ethion	0.2	mg/kg	-	-	-	< 0.2
Ethoprop	0.2	mg/kg	-	-	-	< 0.2
Ethyl parathion	0.2	mg/kg	-	-	-	< 0.2
Fenitrothion	0.2	mg/kg	-	-	-	< 0.2
Fensulfothion	0.2	mg/kg	-	-	-	< 0.2
Fenthion	0.2	mg/kg	-	-	-	< 0.2
Malathion	0.2	mg/kg	-	-	-	< 0.2
Merphos	0.2	mg/kg	-	-	-	< 0.2
Methyl parathion	0.2	mg/kg	-	-	-	< 0.2
Mevinphos	0.2	mg/kg	-	-	-	< 0.2
Monocrotophos	2	mg/kg	-	-	-	< 2
Naled	0.2	mg/kg	-	-	-	< 0.2
Omethoate	2	mg/kg	-	-	-	< 2
Phorate	0.2	mg/kg	-	-	-	< 0.2

Client Sample ID			SS3	SS4	SS5	BH01 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056499	N22-My0056500	N22-My0056501	N22-My0056502
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Pirimiphos-methyl	0.2	mg/kg	-	-	-	< 0.2
Pyrazophos	0.2	mg/kg	-	-	-	< 0.2
Ronnel	0.2	mg/kg	-	-	-	< 0.2
Terbufos	0.2	mg/kg	-	-	-	< 0.2
Tetrachlorvinphos	0.2	mg/kg	-	-	-	< 0.2
Tokuthion	0.2	mg/kg	-	-	-	< 0.2
Trichloronate	0.2	mg/kg	-	-	-	< 0.2
Triphenylphosphate (surr.)	1	%	-	-	-	114
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	-	-	< 50
TRH >C16-C34	100	mg/kg	-	-	-	220
TRH >C34-C40	100	mg/kg	-	-	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	-	-	220
Heavy Metals						
Arsenic	2	mg/kg	4.7	6.6	6.1	5.7
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	21	29	52	37
Copper	5	mg/kg	18	51	15	21
Lead	5	mg/kg	12	16	11	10
Mercury	0.1	mg/kg	< 0.1	0.3	< 0.1	< 0.1
Nickel	5	mg/kg	20	20	25	27
Zinc	5	mg/kg	58	21	26	28
% Moisture	1	%	13	12	16	11
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	-	160
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	-	4.9
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	-	11

Client Sample ID			BH01 0.4-0.5	BH02 0.0-0.1	BH03 0.0-0.1	BH03 0.9-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056503	N22-My0056504	N22-My0056505	N22-My0056506
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	< 20	-	-
TRH C10-C14	20	mg/kg	-	46	-	-
TRH C15-C28	50	mg/kg	-	230	-	-
TRH C29-C36	50	mg/kg	-	99	-	-
TRH C10-C36 (Total)	50	mg/kg	-	375	-	-
BTEX						
Benzene	0.1	mg/kg	-	< 0.1	-	-
Toluene	0.1	mg/kg	-	< 0.1	-	-
Ethylbenzene	0.1	mg/kg	-	< 0.1	-	-
m&p-Xylenes	0.2	mg/kg	-	< 0.2	-	-
o-Xylene	0.1	mg/kg	-	< 0.1	-	-

Client Sample ID			BH01 0.4-0.5	BH02 0.0-0.1	BH03 0.0-0.1	BH03 0.9-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056503	N22-My0056504	N22-My0056505	N22-My0056506
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
BTEX						
Xylenes - Total*	0.3	mg/kg	-	< 0.3	-	-
4-Bromofluorobenzene (surr.)	1	%	-	72	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	< 0.5	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	65	-	-
TRH C6-C10	20	mg/kg	-	< 20	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	< 20	-	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	-	-
Acenaphthene	0.5	mg/kg	-	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	-	< 0.5	-	-
Anthracene	0.5	mg/kg	-	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	-	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	-	-
Chrysene	0.5	mg/kg	-	< 0.5	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	-	< 0.5	-	-
Fluoranthene	0.5	mg/kg	-	0.8	-	-
Fluorene	0.5	mg/kg	-	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	< 0.5	-	-
Naphthalene	0.5	mg/kg	-	< 0.5	-	-
Phenanthrene	0.5	mg/kg	-	1.0	-	-
Pyrene	0.5	mg/kg	-	0.6	-	-
Total PAH*	0.5	mg/kg	-	2.4	-	-
2-Fluorobiphenyl (surr.)	1	%	-	93	-	-
p-Terphenyl-d14 (surr.)	1	%	-	99	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	65	-	-
TRH >C16-C34	100	mg/kg	-	280	-	-
TRH >C34-C40	100	mg/kg	-	< 100	-	-
TRH >C10-C40 (total)*	100	mg/kg	-	345	-	-
Heavy Metals						
Arsenic	2	mg/kg	5.5	5.3	8.6	4.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	42	30	19	30
Copper	5	mg/kg	14	31	11	25
Lead	5	mg/kg	9.8	11	9.4	11
Mercury	0.1	mg/kg	< 0.1	0.2	< 0.1	0.3
Nickel	5	mg/kg	19	26	9.5	39
Zinc	5	mg/kg	11	34	12	14
% Moisture	1	%	19	9.9	6.9	15

Client Sample ID			[G01]BH04 0.0-0.1	BH05 0.0-0.1	BH06 0.0-0.1	BH07 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056507	N22-My0056508	N22-My0056509	N22-My0056510
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 200	38	-	< 20
TRH C15-C28	50	mg/kg	< 500	180	-	< 50
TRH C29-C36	50	mg/kg	< 500	130	-	< 50
TRH C10-C36 (Total)	50	mg/kg	< 500	348	-	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	87	90	-	86
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 500	< 50	-	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	0.6	< 0.5	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluoranthene	0.5	mg/kg	0.9	< 0.5	-	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	0.5	-	< 0.5
Pyrene	0.5	mg/kg	1.0	< 0.5	-	< 0.5
Total PAH*	0.5	mg/kg	2.5	0.5	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	128	97	-	87
p-Terphenyl-d14 (surr.)	1	%	137	91	-	95
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	-	-	< 0.1
4.4'-DDD	0.05	mg/kg	-	-	-	< 0.05
4.4'-DDE	0.05	mg/kg	-	-	-	< 0.05
4.4'-DDT	0.05	mg/kg	-	-	-	< 0.05
a-HCH	0.05	mg/kg	-	-	-	< 0.05
Aldrin	0.05	mg/kg	-	-	-	< 0.05

Client Sample ID			[G01]BH04 0.0-0.1	BH05 0.0-0.1	BH06 0.0-0.1	BH07 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056507	N22-My0056508	N22-My0056509	N22-My0056510
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
b-HCH	0.05	mg/kg	-	-	-	< 0.05
d-HCH	0.05	mg/kg	-	-	-	< 0.05
Dieldrin	0.05	mg/kg	-	-	-	< 0.05
Endosulfan I	0.05	mg/kg	-	-	-	< 0.05
Endosulfan II	0.05	mg/kg	-	-	-	< 0.05
Endosulfan sulphate	0.05	mg/kg	-	-	-	< 0.05
Endrin	0.05	mg/kg	-	-	-	< 0.05
Endrin aldehyde	0.05	mg/kg	-	-	-	< 0.05
Endrin ketone	0.05	mg/kg	-	-	-	< 0.05
g-HCH (Lindane)	0.05	mg/kg	-	-	-	< 0.05
Heptachlor	0.05	mg/kg	-	-	-	< 0.05
Heptachlor epoxide	0.05	mg/kg	-	-	-	< 0.05
Hexachlorobenzene	0.05	mg/kg	-	-	-	< 0.05
Methoxychlor	0.05	mg/kg	-	-	-	< 0.05
Toxaphene	0.5	mg/kg	-	-	-	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	-	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	-	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	-	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	-	-	-	80
Tetrachloro-m-xylene (surr.)	1	%	-	-	-	78
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	-	-	< 0.2
Bolstar	0.2	mg/kg	-	-	-	< 0.2
Chlorfenvinphos	0.2	mg/kg	-	-	-	< 0.2
Chlorpyrifos	0.2	mg/kg	-	-	-	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	-	-	-	< 0.2
Coumaphos	2	mg/kg	-	-	-	< 2
Demeton-S	0.2	mg/kg	-	-	-	< 0.2
Demeton-O	0.2	mg/kg	-	-	-	< 0.2
Diazinon	0.2	mg/kg	-	-	-	< 0.2
Dichlorvos	0.2	mg/kg	-	-	-	< 0.2
Dimethoate	0.2	mg/kg	-	-	-	< 0.2
Disulfoton	0.2	mg/kg	-	-	-	< 0.2
EPN	0.2	mg/kg	-	-	-	< 0.2
Ethion	0.2	mg/kg	-	-	-	< 0.2
Ethoprop	0.2	mg/kg	-	-	-	< 0.2
Ethyl parathion	0.2	mg/kg	-	-	-	< 0.2
Fenitrothion	0.2	mg/kg	-	-	-	< 0.2
Fensulfothion	0.2	mg/kg	-	-	-	< 0.2
Fenthion	0.2	mg/kg	-	-	-	< 0.2
Malathion	0.2	mg/kg	-	-	-	< 0.2
Merphos	0.2	mg/kg	-	-	-	< 0.2
Methyl parathion	0.2	mg/kg	-	-	-	< 0.2
Mevinphos	0.2	mg/kg	-	-	-	< 0.2
Monocrotophos	2	mg/kg	-	-	-	< 2
Naled	0.2	mg/kg	-	-	-	< 0.2
Omethoate	2	mg/kg	-	-	-	< 2
Phorate	0.2	mg/kg	-	-	-	< 0.2

Client Sample ID			[G01]BH04 0.0-0.1	BH05 0.0-0.1	BH06 0.0-0.1	BH07 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056507	N22-My0056508	N22-My0056509	N22-My0056510
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Pirimiphos-methyl	0.2	mg/kg	-	-	-	< 0.2
Pyrazophos	0.2	mg/kg	-	-	-	< 0.2
Ronnel	0.2	mg/kg	-	-	-	< 0.2
Terbufos	0.2	mg/kg	-	-	-	< 0.2
Tetrachlorvinphos	0.2	mg/kg	-	-	-	< 0.2
Tokuthion	0.2	mg/kg	-	-	-	< 0.2
Trichloronate	0.2	mg/kg	-	-	-	< 0.2
Triphenylphosphate (surr.)	1	%	-	-	-	91
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 500	< 50	-	< 50
TRH >C16-C34	100	mg/kg	< 1000	260	-	< 100
TRH >C34-C40	100	mg/kg	< 1000	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 1000	260	-	< 100
Heavy Metals						
Arsenic	2	mg/kg	4.1	8.5	30	6.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	23	36	31	47
Copper	5	mg/kg	13	12	6.7	15
Lead	5	mg/kg	7.5	15	19	10
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	15	14	31	29
Zinc	5	mg/kg	43	40	53	30
% Moisture	1	%	8.6	20	12	19

Client Sample ID			BH08 0.0-0.1	BH09 0.0-0.1	BH09 0.4-0.5	D.18.5.22
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056511	N22-My0056512	N22-My0056513	N22-My0056514
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 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	-	57	-	130
TRH C29-C36	50	mg/kg	-	62	-	< 50
TRH C10-C36 (Total)	50	mg/kg	-	119	-	130
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	-	0.3	-	< 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	%	-	83	-	87

Client Sample ID			BH08 0.0-0.1	BH09 0.0-0.1	BH09 0.4-0.5	D.18.5.22
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-My0056511	N22-My0056512	N22-My0056513	N22-My0056514
Date Sampled			May 18, 2022	May 18, 2022	May 18, 2022	May 18, 2022
Test/Reference	LOR	Unit				
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	-	< 0.5	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	-	1.2
Acenaphthene	0.5	mg/kg	-	< 0.5	-	< 0.5
Acenaphthylene	0.5	mg/kg	-	< 0.5	-	< 0.5
Anthracene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	< 0.5	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	-	< 0.5
Chrysene	0.5	mg/kg	-	< 0.5	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	< 0.5	-	< 0.5
Fluoranthene	0.5	mg/kg	-	< 0.5	-	< 0.5
Fluorene	0.5	mg/kg	-	< 0.5	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	< 0.5	-	< 0.5
Naphthalene	0.5	mg/kg	-	< 0.5	-	< 0.5
Phenanthrene	0.5	mg/kg	-	< 0.5	-	< 0.5
Pyrene	0.5	mg/kg	-	< 0.5	-	< 0.5
Total PAH*	0.5	mg/kg	-	< 0.5	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	80	-	98
p-Terphenyl-d14 (surr.)	1	%	-	89	-	90
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	< 50	-	< 50
TRH >C16-C34	100	mg/kg	-	< 100	-	190
TRH >C34-C40	100	mg/kg	-	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	< 100	-	190
Heavy Metals						
Arsenic	2	mg/kg	6.6	150	4.0	12
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	31	34	29	28
Copper	5	mg/kg	30	23	22	15
Lead	5	mg/kg	13	13	8.4	10
Mercury	0.1	mg/kg	0.6	0.3	0.2	< 0.1
Nickel	5	mg/kg	12	16	19	26
Zinc	5	mg/kg	18	25	23	27
% Moisture	1	%	12	11	15	11
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	410	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	8.3	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	50	-

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	May 28, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	May 28, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	May 28, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	May 28, 2022	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	May 28, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Sydney	May 28, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides	Sydney	May 28, 2022	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	May 28, 2022	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
% Moisture	Sydney	May 24, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	May 28, 2022	7 Days
- Method: LTM-INO-4030 Conductivity			
Cation Exchange Capacity	Melbourne	May 31, 2022	28 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	May 28, 2022	7 Days
- Method: LTM-GEN-7090 pH by ISE			

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Company Name: Qualtest
Address: 2 Murray Dwyer Circuit
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Project Name: MSC- MUSWELLBROOK
Project ID: NEW22P-0092

Order No.:
Report #: 891062
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: May 23, 2022 2:18 PM
Due: May 30, 2022
Priority: 5 Day
Contact Name: Libby Betz

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	Suite B14: OCP/OPP	Moisture Set	Cation Exchange Capacity	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	S1	May 18, 2022		Soil	N22-My0056495	X				X	X		X
2	S3	May 18, 2022		Soil	N22-My0056496	X			X		X		
3	S4	May 18, 2022		Soil	N22-My0056497	X			X		X		
4	SS1	May 18, 2022		Soil	N22-My0056498	X					X		X
5	SS3	May 18, 2022		Soil	N22-My0056499	X			X		X		
6	SS4	May 18, 2022		Soil	N22-	X			X		X		

Date Reported:Jun 06, 2022

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Company Name: Qualtest
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Project Name: MSC- MUSWELLBROOK
Project ID: NEW22P-0092

Order No.:
Report #: 891062
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: May 23, 2022 2:18 PM
Due: May 30, 2022
Priority: 5 Day
Contact Name: Libby Betz

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	Suite B14: OCP/OPP	Moisture Set	Cation Exchange Capacity	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
					My0056500								
7	SS5	May 18, 2022		Soil	N22-My0056501	X			X		X		
8	BH01 0.0-0.1	May 18, 2022		Soil	N22-My0056502	X		X		X	X	X	X
9	BH01 0.4-0.5	May 18, 2022		Soil	N22-My0056503	X			X		X		
10	BH02 0.0-0.1	May 18, 2022		Soil	N22-My0056504	X					X		X
11	BH03 0.0-0.1	May 18, 2022		Soil	N22-My0056505	X			X		X		
12	BH03 0.9-1.0	May 18, 2022		Soil	N22-My0056506	X			X		X		

Date Reported:Jun 06, 2022

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

Project Name: MSC- MUSWELLBROOK
Project ID: NEW22P-0092

Order No.:
Report #: 891062
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: May 23, 2022 2:18 PM
Due: May 30, 2022
Priority: 5 Day
Contact Name: Libby Betz

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	Suite B14: OCP/OPP	Moisture Set	Cation Exchange Capacity	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
13	BH04 0.0-0.1	May 18, 2022		Soil	N22-My0056507	X					X		X
14	BH05 0.0-0.1	May 18, 2022		Soil	N22-My0056508	X					X		X
15	BH06 0.0-0.1	May 18, 2022		Soil	N22-My0056509	X			X		X		
16	BH07 0.0-0.1	May 18, 2022		Soil	N22-My0056510	X				X	X		X
17	BH08 0.0-0.1	May 18, 2022		Soil	N22-My0056511	X			X		X		
18	BH09 0.0-0.1	May 18, 2022		Soil	N22-My0056512	X					X		X
19	BH09 0.4-0.5	May 18, 2022		Soil	N22-	X		X	X		X	X	

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Sample Detail						Asbestos - AS4964	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	Suite B14: OCP/OPP	Moisture Set	Cation Exchange Capacity	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
					My0056513								
20	D.18.5.22	May 18, 2022		Soil	N22-My0056514						X		X
21	S2	May 18, 2022		Soil	N22-My0056515		X						
22	SS2	May 18, 2022		Soil	N22-My0056516		X						
23	BH03 0.4-0.5	May 18, 2022		Soil	N22-My0056517		X						
24	BH03 1.7-1.8	May 18, 2022		Soil	N22-My0056518		X						
25	BH04 0.4-0.5	May 18, 2022		Soil	N22-My0056519		X						

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Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
26	BH04 0.6-0.7	May 18, 2022		Soil	N22-My0056520		X						
27	BH05 0.4-0.5	May 18, 2022		Soil	N22-My0056521		X						
28	BH05 0.6-0.7	May 18, 2022		Soil	N22-My0056522		X						
29	BH06 0.2-0.3	May 18, 2022		Soil	N22-My0056523		X						
30	BH07 0.5-0.6	May 18, 2022		Soil	N22-My0056524		X						
31	BH08 0.9-1.0	May 18, 2022		Soil	N22-My0056525		X						
32	BH08 1.7-1.8	May 18, 2022		Soil	N22-		X						

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Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
					My0056526								
33	BH09 1.3-1.4	May 18, 2022		Soil	N22-My0056527		X						
34	D1.18.5.22	May 18, 2022		Soil	N22-My0056528		X						
35	T1.18.5.22	May 18, 2022		Soil	N22-My0056529		X						
Test Counts						19	15	2	11	3	20	2	9

Date Reported:Jun 06, 2022

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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							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-HCH	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
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	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
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	
Method Blank							
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
Method Blank							
Cation Exchange Capacity							
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	110			70-130	Pass	
TRH C10-C14	%	110			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	95			70-130	Pass	
Toluene	%	97			70-130	Pass	
Ethylbenzene	%	95			70-130	Pass	
m&p-Xylenes	%	98			70-130	Pass	
o-Xylene	%	93			70-130	Pass	
Xylenes - Total*	%	96			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	78			70-130	Pass	
TRH C6-C10	%	109			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	75			70-130	Pass	
Acenaphthylene	%	92			70-130	Pass	
Anthracene	%	70			70-130	Pass	
Benz(a)anthracene	%	81			70-130	Pass	
Benzo(a)pyrene	%	79			70-130	Pass	
Benzo(b&j)fluoranthene	%	90			70-130	Pass	
Benzo(g.h.i)perylene	%	90			70-130	Pass	
Benzo(k)fluoranthene	%	80			70-130	Pass	
Chrysene	%	75			70-130	Pass	
Dibenz(a.h)anthracene	%	78			70-130	Pass	
Fluoranthene	%	74			70-130	Pass	
Fluorene	%	83			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	88			70-130	Pass	
Naphthalene	%	78			70-130	Pass	
Phenanthrene	%	85			70-130	Pass	
Pyrene	%	81			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	91			70-130	Pass	
4.4'-DDD	%	74			70-130	Pass	
4.4'-DDE	%	86			70-130	Pass	
4.4'-DDT	%	72			70-130	Pass	
a-HCH	%	86			70-130	Pass	
Aldrin	%	87			70-130	Pass	
b-HCH	%	83			70-130	Pass	
d-HCH	%	72			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dieldrin	%	75			70-130	Pass	
Endosulfan I	%	84			70-130	Pass	
Endosulfan II	%	77			70-130	Pass	
Endosulfan sulphate	%	81			70-130	Pass	
Endrin	%	73			70-130	Pass	
Endrin aldehyde	%	103			70-130	Pass	
Endrin ketone	%	75			70-130	Pass	
g-HCH (Lindane)	%	90			70-130	Pass	
Heptachlor	%	75			70-130	Pass	
Heptachlor epoxide	%	81			70-130	Pass	
Hexachlorobenzene	%	72			70-130	Pass	
Methoxychlor	%	94			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	70			70-130	Pass	
Dimethoate	%	74			70-130	Pass	
Ethion	%	100			70-130	Pass	
Fenitrothion	%	101			70-130	Pass	
Methyl parathion	%	111			70-130	Pass	
Mevinphos	%	80			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	111			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	83			80-120	Pass	
Cadmium	%	82			80-120	Pass	
Chromium	%	86			80-120	Pass	
Copper	%	88			80-120	Pass	
Lead	%	90			80-120	Pass	
Mercury	%	101			80-120	Pass	
Nickel	%	86			80-120	Pass	
Zinc	%	83			80-120	Pass	
LCS - % Recovery							
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	98			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S22-My0056861	NCP	%	81			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S22-Jn0005129	NCP	%	78			70-130	Pass	
Acenaphthylene	S22-Jn0005129	NCP	%	98			70-130	Pass	
Anthracene	S22-My0042205	NCP	%	90			70-130	Pass	
Benz(a)anthracene	S22-Jn0005129	NCP	%	81			70-130	Pass	
Benzo(a)pyrene	S22-Jn0005129	NCP	%	81			70-130	Pass	
Benzo(b&j)fluoranthene	S22-Jn0005129	NCP	%	82			70-130	Pass	
Benzo(g.h.i)perylene	S22-Jn0005129	NCP	%	84			70-130	Pass	
Benzo(k)fluoranthene	S22-Jn0005129	NCP	%	77			70-130	Pass	
Chrysene	S22-Jn0005129	NCP	%	80			70-130	Pass	
Dibenz(a.h)anthracene	S22-Jn0005129	NCP	%	78			70-130	Pass	
Fluoranthene	S22-Jn0005129	NCP	%	73			70-130	Pass	
Fluorene	S22-Jn0005129	NCP	%	83			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S22-Jn0005129	NCP	%	81			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	S22-Jn0005129	NCP	%	83			70-130	Pass	
Phenanthrene	S22-Jn0005129	NCP	%	74			70-130	Pass	
Pyrene	S22-Jn0005129	NCP	%	79			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S22-My0056861	NCP	%	82			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S22-My0056861	NCP	%	81			75-125	Pass	
Cadmium	S22-My0056861	NCP	%	100			75-125	Pass	
Chromium	S22-My0068432	NCP	%	97			75-125	Pass	
Copper	S22-My0056861	NCP	%	86			75-125	Pass	
Lead	S22-My0056861	NCP	%	98			75-125	Pass	
Mercury	S22-My0056861	NCP	%	116			75-125	Pass	
Nickel	S22-My0056861	NCP	%	85			75-125	Pass	
Zinc	S22-My0056861	NCP	%	101			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	N22-My0056508	CP	%	111			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	N22-My0056508	CP	%	92			70-130	Pass	
Toluene	N22-My0056508	CP	%	96			70-130	Pass	
Ethylbenzene	N22-My0056508	CP	%	94			70-130	Pass	
m&p-Xylenes	N22-My0056508	CP	%	100			70-130	Pass	
o-Xylene	N22-My0056508	CP	%	92			70-130	Pass	
Xylenes - Total*	N22-My0056508	CP	%	97			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	N22-My0056508	CP	%	84			70-130	Pass	
TRH C6-C10	N22-My0056508	CP	%	117			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	N22-My0056495	CP	mg/kg	24	16	35	30%	Fail	Q15
Cadmium	N22-My0056495	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	N22-My0056495	CP	mg/kg	50	39	26	30%	Pass	
Copper	N22-My0056495	CP	mg/kg	8.8	12	31	30%	Fail	Q15
Lead	N22-My0056495	CP	mg/kg	11	8.7	23	30%	Pass	
Mercury	N22-My0056495	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	N22-My0056495	CP	mg/kg	12	8.8	32	30%	Fail	Q15
Zinc	N22-My0056495	CP	mg/kg	12	12	2.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	N22-My0056502	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	N22-My0056502	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	N22-My0056502	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	N22-My0056502	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	N22-My0056502	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	N22-My0056502	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	N22-My0056502	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	N22-My0056502	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	N22-My0056502	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S22-My0066948	NCP	uS/cm	66	72	9.3	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S22-My0066948	NCP	pH Units	10	10	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	N22-My0056504	CP	mg/kg	0.8	0.5	41	30%	Fail	Q15
Fluorene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	N22-My0056504	CP	mg/kg	1.0	0.6	52	30%	Fail	Q15
Pyrene	N22-My0056504	CP	mg/kg	0.6	< 0.5	40	30%	Fail	Q15
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	N22-My0056504	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	N22-My0056504	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	N22-My0056504	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Chlorpyrifos-methyl	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	N22-My0056504	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	N22-My0056504	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	N22-My0056504	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	N22-My0056504	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	N22-My0056504	CP	%	9.9	9.1	8.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	N22-My0056507	CP	mg/kg	< 200	< 200	<1	30%	Pass	
TRH C15-C28	N22-My0056507	CP	mg/kg	< 500	< 500	<1	30%	Pass	
TRH C29-C36	N22-My0056507	CP	mg/kg	< 500	< 500	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	N22-My0056507	CP	mg/kg	< 500	< 500	<1	30%	Pass	
TRH >C16-C34	N22-My0056507	CP	mg/kg	< 1000	< 1000	<1	30%	Pass	
TRH >C34-C40	N22-My0056507	CP	mg/kg	< 1000	< 1000	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	N22-My0056513	CP	mg/kg	4.0	5.4	29	30%	Pass	
Cadmium	N22-My0056513	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	N22-My0056513	CP	mg/kg	29	26	9.0	30%	Pass	
Copper	N22-My0056513	CP	mg/kg	22	27	20	30%	Pass	
Lead	N22-My0056513	CP	mg/kg	8.4	12	34	30%	Fail	Q15
Mercury	N22-My0056513	CP	mg/kg	0.2	0.2	5.0	30%	Pass	
Nickel	N22-My0056513	CP	mg/kg	19	17	7.0	30%	Pass	
Zinc	N22-My0056513	CP	mg/kg	23	22	5.0	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	N22-My0056514	CP	mg/kg	12	11	2.0	30%	Pass	
Cadmium	N22-My0056514	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	N22-My0056514	CP	mg/kg	28	28	1.0	30%	Pass	
Copper	N22-My0056514	CP	mg/kg	15	15	<1	30%	Pass	
Lead	N22-My0056514	CP	mg/kg	10	10	1.0	30%	Pass	
Mercury	N22-My0056514	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	N22-My0056514	CP	mg/kg	26	26	1.0	30%	Pass	
Zinc	N22-My0056514	CP	mg/kg	27	27	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	N22-My0056514	CP	%	11	15	28	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
Chamath JHM Annakkage	Senior Analyst-Asbestos
Emily Rosenberg	Senior Analyst-Metal
Gabriele Cordero	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic
Sayeed Abu	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
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:	Libby Betz
Report	891062-AID
Project Name	MSC- MUSWELLBROOK
Project ID	NEW22P-0092
Received Date	May 23, 2022
Date Reported	Jun 06, 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 MSC- MUSWELLBROOK
Project ID NEW22P-0092
Date Sampled May 18, 2022
Report 891062-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
S1	22-My0056495	May 18, 2022	Approximate Sample 219g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
S3	22-My0056496	May 18, 2022	Approximate Sample 97g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
S4	22-My0056497	May 18, 2022	Approximate Sample 156g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS1	22-My0056498	May 18, 2022	Approximate Sample 144g Sample consisted of: Brown fine-grained clayey soil, glass, cement and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS3	22-My0056499	May 18, 2022	Approximate Sample 104g Sample consisted of: Brown fine-grained clayey soil, brick and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS4	22-My0056500	May 18, 2022	Approximate Sample 191g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS5	22-My0056501	May 18, 2022	Approximate Sample 213g Sample consisted of: Brown fine-grained clayey soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH01 0.0-0.1	22-My0056502	May 18, 2022	Approximate Sample 150g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
BH01 0.4-0.5	22-My0056503	May 18, 2022	Approximate Sample 49g Sample consisted of: Brown coarse-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH02 0.0-0.1	22-My0056504	May 18, 2022	Approximate Sample 127g Sample consisted of: Brown fine-grained clayey soil, coal and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH03 0.0-0.1	22-My0056505	May 18, 2022	Approximate Sample 168g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH03 0.9-1.0	22-My0056506	May 18, 2022	Approximate Sample 149g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH04 0.0-0.1	22-My0056507	May 18, 2022	Approximate Sample 181g Sample consisted of: Brown coarse-grained soil, bitumen and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH05 0.0-0.1	22-My0056508	May 18, 2022	Approximate Sample 150g Sample consisted of: Brown fine-grained clayey soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH06 0.0-0.1	22-My0056509	May 18, 2022	Approximate Sample 129g Sample consisted of: Brown fine-grained clayey soil, brick and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH07 0.0-0.1	22-My0056510	May 18, 2022	Approximate Sample 87g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH08 0.0-0.1	22-My0056511	May 18, 2022	Approximate Sample 198g Sample consisted of: Brown fine-grained clayey soil, coal, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH09 0.0-0.1	22-My0056512	May 18, 2022	Approximate Sample 128g Sample consisted of: Brown coarse-grained soil, coal and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH09 0.4-0.5	22-My0056513	May 18, 2022	Approximate Sample 128g Sample consisted of: Brown fine-grained clayey soil, plaster, coal and rocks	No asbestos detected at the reporting limit of 0.01% 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	May 24, 2022	Indefinite

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

Project Name: MSC- MUSWELLBROOK
Project ID: NEW22P-0092

Order No.:
Report #: 891062
Phone: 02 4968 4468
Fax: 02 4960 9775

Received: May 23, 2022 2:18 PM
Due: May 30, 2022
Priority: 5 Day
Contact Name: Libby Betz

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	Suite B14: OCP/OPP	Moisture Set	Cation Exchange Capacity	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	S1	May 18, 2022		Soil	N22-My0056495	X				X	X		X
2	S3	May 18, 2022		Soil	N22-My0056496	X			X		X		
3	S4	May 18, 2022		Soil	N22-My0056497	X			X		X		
4	SS1	May 18, 2022		Soil	N22-My0056498	X					X		X
5	SS3	May 18, 2022		Soil	N22-My0056499	X			X		X		
6	SS4	May 18, 2022		Soil	N22-	X			X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
					My0056500								
7	SS5	May 18, 2022		Soil	N22-My0056501	X			X		X		
8	BH01 0.0-0.1	May 18, 2022		Soil	N22-My0056502	X		X		X	X	X	X
9	BH01 0.4-0.5	May 18, 2022		Soil	N22-My0056503	X			X		X		
10	BH02 0.0-0.1	May 18, 2022		Soil	N22-My0056504	X					X		X
11	BH03 0.0-0.1	May 18, 2022		Soil	N22-My0056505	X			X		X		
12	BH03 0.9-1.0	May 18, 2022		Soil	N22-My0056506	X			X		X		

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Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
13	BH04 0.0-0.1	May 18, 2022		Soil	N22-My0056507	X					X		X
14	BH05 0.0-0.1	May 18, 2022		Soil	N22-My0056508	X					X		X
15	BH06 0.0-0.1	May 18, 2022		Soil	N22-My0056509	X			X		X		
16	BH07 0.0-0.1	May 18, 2022		Soil	N22-My0056510	X				X	X		X
17	BH08 0.0-0.1	May 18, 2022		Soil	N22-My0056511	X			X		X		
18	BH09 0.0-0.1	May 18, 2022		Soil	N22-My0056512	X					X		X
19	BH09 0.4-0.5	May 18, 2022		Soil	N22-	X		X	X		X	X	

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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	Suite B14: OCP/OPP	Moisture Set	Cation Exchange Capacity	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
					My0056513								
20	D.18.5.22	May 18, 2022		Soil	N22-My0056514						X		X
21	S2	May 18, 2022		Soil	N22-My0056515		X						
22	SS2	May 18, 2022		Soil	N22-My0056516		X						
23	BH03 0.4-0.5	May 18, 2022		Soil	N22-My0056517		X						
24	BH03 1.7-1.8	May 18, 2022		Soil	N22-My0056518		X						
25	BH04 0.4-0.5	May 18, 2022		Soil	N22-My0056519		X						

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Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
26	BH04 0.6-0.7	May 18, 2022		Soil	N22-My0056520		X						
27	BH05 0.4-0.5	May 18, 2022		Soil	N22-My0056521		X						
28	BH05 0.6-0.7	May 18, 2022		Soil	N22-My0056522		X						
29	BH06 0.2-0.3	May 18, 2022		Soil	N22-My0056523		X						
30	BH07 0.5-0.6	May 18, 2022		Soil	N22-My0056524		X						
31	BH08 0.9-1.0	May 18, 2022		Soil	N22-My0056525		X						
32	BH08 1.7-1.8	May 18, 2022		Soil	N22-		X						

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Melbourne Laboratory - NATA # 1261 Site # 1254												X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794													
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Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
					My0056526								
33	BH09 1.3-1.4	May 18, 2022		Soil	N22-My0056527		X						
34	D1.18.5.22	May 18, 2022		Soil	N22-My0056528		X						
35	T1.18.5.22	May 18, 2022		Soil	N22-My0056529		X						
Test Counts						19	15	2	11	3	20	2	9

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

The sample received was not collected in an approved asbestos bag and was therefore sub-sampled from the 250mL glass jar. Valid sub-sampling procedures were applied so as to ensure that the sub-sample to be analysed accurately represented the sample received.

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
Chamath JHM Annakkage	Senior Analyst-Asbestos

Authorised by:

Chamath JHM Annakkage	Senior Analyst-Asbestos
Sayeed Abu	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.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2218449**	Page	: 1 of 6
Client	: **QUALTEST LABORATORY(NSW) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: LIBBY BETZ	Contact	: Customer Services ES
Address	: 2 MURRAY DWYER CIRUIT MAYFIELD WEST 2304	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4968 4468	Telephone	: +61-2-8784 8555
Project	: MSC – Muswellbrook	Date Samples Received	: 26-May-2022 16:30
Order number	: ----	Date Analysis Commenced	: 31-May-2022
C-O-C number	: ----	Issue Date	: 03-Jun-2022 11:57
Sampler	: B.Snow		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	T.18.5.22	----	----	----	----
				Sampling date / time	18-May-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2218449-001	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**10.2**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		**7**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		**39**	----	----	----	----
Copper	7440-50-8	5	mg/kg		**23**	----	----	----	----
Lead	7439-92-1	5	mg/kg		**9**	----	----	----	----
Nickel	7440-02-0	2	mg/kg		**28**	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**36**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	T.18.5.22	----	----	----	----
				Sampling date / time	18-May-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2218449-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**84.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**94.4**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**100**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**94.5**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**107**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**102**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**100**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**114**	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)				Sample ID	T.18.5.22	----	----	----	----
				Sampling date / time	18-May-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**ES2218449-001**	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**108**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

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

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2218449**	Page	: 1 of 4
Client	: **QUALTEST LABORATORY(NSW) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: LIBBY BETZ	Telephone	: +61-2-8784 8555
Project	: MSC – Muswellbrook	Date Samples Received	: 26-May-2022
Site	: ----	Issue Date	: 03-Jun-2022
Sampler	: B.Snow	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Moisture Content	1	13	7.69	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / *Container* / Client Sample ID(s)	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
T.18.5.22	**18-May-2022**	**----**	----	----	**31-May-2022**	01-Jun-2022	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
T.18.5.22	**18-May-2022**	**31-May-2022**	14-Nov-2022	✓	**01-Jun-2022**	14-Nov-2022	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
T.18.5.22	**18-May-2022**	**31-May-2022**	15-Jun-2022	✓	**01-Jun-2022**	15-Jun-2022	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
T.18.5.22	**18-May-2022**	**01-Jun-2022**	01-Jun-2022	✓	**01-Jun-2022**	11-Jul-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
T.18.5.22	**18-May-2022**	**01-Jun-2022**	01-Jun-2022	✓	**02-Jun-2022**	11-Jul-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
T.18.5.22	**18-May-2022**	**31-May-2022**	01-Jun-2022	✓	**01-Jun-2022**	01-Jun-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071)							
T.18.5.22	**18-May-2022**	**01-Jun-2022**	01-Jun-2022	✓	**02-Jun-2022**	11-Jul-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
T.18.5.22	**18-May-2022**	**31-May-2022**	01-Jun-2022	✓	**01-Jun-2022**	01-Jun-2022	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
T.18.5.22	**18-May-2022**	**31-May-2022**	01-Jun-2022	✓	**01-Jun-2022**	01-Jun-2022	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	13	**7.69**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.