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8 August 2024

Attention: Ashley Mackey
Habitat Planning
409 Kiewa Stret
Albury NSW 2680
ashley@habitatplanning.com.au
BY EMAIL

Dear Ashley

Re: Preliminary Site Investigation – Beer Road and Perricoota Road Moama NSW 2731

I refer to the written request from yourself to prepare a Preliminary Site Investigation (PSI) report for the proposed rezoning of land at Beer Road and Perricoota Road Moama NSW, the site. The intended recipient of this report is Murray River Council and the Department of Planning, Housing, and Infrastructure for the proposal to rezone the land from RU1 Primary Production to R1 General Residential.

1. Executive summary

This PSI has been conducted to assess the risk to future site users from potential contamination across the site. This assessment includes a detailed desktop study and a site inspection with soil sampling and analysis for potential chemical contaminants across the site, and an assessment of the results against the Residential A (residential with garden/accessible soil) land use criteria.

The desktop study found the site has a historical agricultural and horticultural land use as far as records can ascertain. Potential contamination sources include persistent agricultural and horticultural chemicals used across the site, timber posts that may have been treated with copper chrome arsenate (CCA), fill material from an unknown source, dumped rubbish, and a filled dam and channels.

The site inspection found drip irrigated grape vines occupying the majority of the site with two ley areas among them. The site was used for flood irrigated agriculture before the vines were planted.

The soil analysis for persistent agricultural and horticultural chemicals returned results below the adopted criteria for Residential A land use.

Therefore, it is assessed the site is suitable for the proposed rezoning to residential given management strategies as recommended are implemented during development.

2. Objectives

To determine whether potential site contamination poses a risk to human health for under a rezoned residential land use scenario.

3. Scope of work

To conduct a desktop study and detailed site inspection with sampling, analyse the data reliability, and undertake a risk assessment to human health based on the results.

4. Site identification

Land parcel area – 31.2ha (approximately).

Address - Beer Road Moama NSW 2731.

Real property description - Lots 2 and 3 in DP 1213161 and Lot 15 in DP 1273625.

Centre coordinates - 295700E 6004235N (MGA Zone 55).

A location map can be seen in **Attachment A**.

5. Site history

The site has a historical agricultural and horticultural land use as far as records can ascertain, and from the available aerial photography and satellite imagery was used for flood irrigated broadacre farming before being levelled and developed for permanent plantings sometime between 1996 and 2002. A dam and irrigation channels were also filled sometime between 1996 and 2002, **Attachment B**.

The site has been owned by various owners since the purchase of the land grant in 1869 (known as Portion 16 and part of Portion 20). In 1908, both allotments were owned by Michael Kickham, mill manager and then owned by Patrick and Laurence Phelan (both farmers) from 1938 to at least 1946. The allotments were subdivided into their current lots in 1998. The current owner is Oakbridge Dungala Pty Ltd who purchased the site from Richard Alan McLean and Lisa Nicole McLean in 2022.

6. Site condition and surrounding environment

The site is located around 3km northwest of Moama on the high Murray River floodplain at an elevation of around 97m AHD and is bound by Beer Road to the north, agricultural and residential land to the south and east, and Twenty Four Lane to the west. The site is predominantly horticultural plantings (grape vines) with some ley ground among it. These ley areas presumably were areas designated to be built upon.

The vines are oriented north south and are drip irrigated. At this time of the site inspection, the site surface between the vines was annual grasses and broadleaf weeds. There is a mix of untreated and treated timber posts within the vineyard. The treated timber posts may potentially contain copper chrome arsenate (CCA) which is used to make the timber resistant to pests and fungi.

The site consists of three lots – Lot 2, Lot 3, and Lot 15. Lot 2 is planted with grape vines. A stockpile of soil fill material is located on the southern boundary of Lot 2. Concrete, irrigation fittings, wood,

plastic, and broken bits of fibrous sheeting were observed amongst the fill material. No asbestos containing material was observed. A slab on grade tin shed lies in the southeast corner of Lot 2. The shed contains irrigation parts, tyres, and some wood.

Lot 3 is planted with grape vines with a ley area in the approximate centre. Multiple stockpiles of fill material can be seen in the ley area. A small unlined dam is located to the south of the stockpiles, and it is assumed some of the material is from the excavation of the dam. The dam was built between 2016 and 2018 with spoil removed from around it between 2021 and 2022 and assumed to be stockpiled to the north of the dam. The volume of material and the differing soil types indicates most of the fill is from an unknown source. Irrigation pipe, road base, stabilised sand and weed matting could be seen amongst the fill material.

A tin pump shed can be seen in the southeast corner of Lot 3. Plastic containers of foaming tyre and engine cleaner and high-pressure soap are stored on wooden pallets. It is assumed the area was also used to wash and clean boom sprays and machinery. A mix of treated and untreated timber posts have been piled outside the pump shed, along with plastic piping, tyres, and wire. To the north of the pump shed is a small laydown area contain a land plane, an old trailer and precast concrete wing walls.

Lot 15 is also planted with grape vines with a square ley area in the approximate centre of the lot. A rubbish pile is located in the ley area and consists of tyres, tree roots, vines, timber and baling twine. No asbestos containing material was observed. A slab on grade tin garden shed is located in the southwest of Lot 15, along the southern boundary. It is likely the shed was used as a pump shed and parts of poly pipe can be seen. Fertilisers and fungicides were stored inside the shed.

The filled dam and channels identified in the historical aerial photographs were not recognisable during the site inspection.

The surrounding land use is residential to the south (Murray River Resort) and north (The Range residential subdivision) with irrigated permanent plantings to the east and west.

A map of the site features and site photographs can be seen in **Attachment C**.

The site lies mostly the gently undulating plain on the Cadel tilt block with parent materials derived from alluvial, silts, sands, and clays of the Murray River. Surface soils have formed on materials of the Shepparton Formation that are predominantly alluvial with some aeolian addition.

The Murray River lies around 250m at its nearest southwest of the site with no other natural drainages nearby. A linear natural depression covers most of Lot 3, running southeast to north west. The depression is rarely subject to flooding, and development of the site is likely to exclude all floodwater from the depression. A detention basin and public open space/drainage reserve is proposed for the depression area. The relative incline of the site has been modified by earthworks for irrigation.

There is a registered stock and domestic groundwater bore on site (GW504222) constructed to 23m through clay and into water bearing sand at 20m. There are no other registered bores within 2km of the site and typically groundwater is not a drinking water resource in the locale.

7. Sampling and Analysis Quality Plan and sampling methodology

The sampling plan includes an analysis of the Data Quality Objectives (DQOs) which have been developed to define the type and quality of data to meet the project objectives. The DQOs have been developed generally in accordance with the seven step DQO process as outlined in AS 4482.1:2005 and the USA EPA: Guidance on Systematic Planning Using the Data Quality Objectives Process (2006a) with the information inputs provided in this PSI. The DQOs can be provided upon request.

The following sampling was conducted for the assessment of in-situ material for site suitability. These analytes are associated with the previous land use and potential contamination sources.

- A visual and tactile assessment the in-situ material for chemical staining, chemical odours, or the presence of asbestos containing material.
- Eight judgemental soil sample locations across the site. Samples tested for heavy metals and pesticides at a NATA accredited laboratory.
- Sampling undertaken by reference to AS 4482.1:2005 - Guide to the investigation and sampling of sites with potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds (Withdrawn) and AS 4482.2:1999 - Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances (Withdrawn). Although these guidelines have recently been withdrawn, they have been used in the absence of other relevant Australian publications.
- A plan of the sampling locations can be seen in **Attachment D**.
- One duplicate and rinsate sample was taken for the sampling event.

A duplicate and rinsate sample was used to assess sampling quality assurance and quality control with relative percent differences of <30% expected for the duplicate and negligible levels of contamination expected for the rinsate.

The following will be used as an initial analytical screening of the data to determine whether further assessment is required:

- Residential A assessment criteria from Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure 2013: Table 1A (1) Soils with 3m of surface and Table 1B (1-4) Soils within 2m of surface.

Where exceedances of these criteria indicate a risk to human health, further investigation, assessment, and remediation if required, will be carried out as appropriate.

8. Results

The sampling was conducted over one day on 23 July 2024. The weather was sunny with cool winds. Soils were variable, typical of Murray River alluvium. A grab sample was taken at each of the eight sampling locations to 0.3m depth in the topsoil. No chemical staining or odours were noted during the sampling. Sampling locations can be seen in **Attachment D**.

A summary of the analytical results are as follows:

- Heavy metals are below the limit of reporting or the adopted criteria.
- Pesticides are below the limit of reporting or the adopted criteria.

The tabulated results with a comparison to the adopted criteria can be seen in **Attachment E**. Laboratory reports can be seen in **Attachment F**.

9. Quality assurance/quality control data evaluation

The duplicate sample (sample 8) returned relative percent difference of <30% for all analytes. The rinsate sample returned results below the limit of reporting. No outliers exist in the laboratory testing.

In consideration of the adopted QA/QC procedures and the results from their subsequent analysis, McMahon assesses the QA/QC results are suitable for the investigation undertaken and reflect the analytical data is of a suitable quality to determine contamination risk with an appropriate level of confidence.

10. Conceptual site model

The site has been used for agriculture and horticulture as far as records can ascertain. Chemicals associated with persistent agricultural and horticultural pesticide use across the site may have accumulated in the soil. Potential CCA treated timber posts can be seen in the vineyard and piled near the pump shed. Stockpiles of fill material and dumped rubbish can be seen across the site. Pathways are primarily from soil disturbance during development. Receptors include future site users, construction and maintenance workers, and the environment. Short to medium-term soil contact is likely for future construction and maintenance workers. Long-term soil contact is likely for future site users. Based on the past uses and the sampling undertaken, it is assessed that widespread contamination from agricultural and horticultural chemicals is not present at the site.

Groundwater exposure pathways were assessed to be incomplete due to limited access to groundwater. As such, groundwater investigations were not carried out.

There is a low risk of contamination from off-site sources as there are no known gross contaminating activities nearby. The Caltex service station at 73 Meninya Street (located 3km south east of the site) is on the list of NSW contaminated sites notified to the EPA, however regulation under the Contaminated Land Management Act 1997 is not required.

The filled dam and channels are currently covered with fill and planted vines. Thick grass between the vines hampered a thorough inspection of the site surface but these areas will require further investigation and assessment.

11. Site characterisation

Based on the past uses and the sampling undertaken, it is assessed that widespread contamination from agricultural and horticultural chemicals is not present at the site and present a low risk to the

proposed rezoning given management strategies are implemented during development, mainly around unexpected finds.

12. Conclusions and recommendations

This investigation met the objective of investigating and assessing potential contamination to determine whether potential site contamination in the soil poses a risk to human health for the proposed rezoning and subsequent residential A land use.

The results of the investigation conclude that contamination from agricultural and horticultural chemicals is not present at the site, and it is suitable for the proposed development given the following management strategies are adopted:

- The potential CCA treated timber posts are recommended to be removed and disposed of at an appropriately licenced landfill.
- Appropriate waste management for the fill material is required for disposal in line with the NSW EPA (2014) Waste Classification Guidelines.
- The dumped rubbish is an aesthetic issue and is recommended to be removed and disposed of at an appropriately licensed landfill.
- Any other material generated from the site should be managed in accordance with the NSW EPA Waste Classification Guidelines and Resource Recovery Orders, whichever is relevant. This is normally a standard development consent condition.
- The filled dam and channels will require further investigation and assessment.
- Unexpected finds are possible. Care must be taken to identify and evaluate unexpected finds such as these during development under an unexpected finds protocol.

If you have any queries about the contents of this report, please contact the undersigned.

Yours sincerely

David McMahon

Certified Professional Soil Scientist

Certified Environmental Practitioner (Site Contamination Specialist)

BAppSc (Ag) GradDip (Water) MEnvMgmt

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List of attachments

A. Site maps and supplied proposed rezoning map

B. Aerial photographs and satellite images

D. Map of site features and site photographs

E. Sampling locations

F. Tabulated results

G. Laboratory reports

Limitations and disclaimer

DM McMahon Pty Ltd has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Habitat Planning, Murray River Council, the Department of Planning, Housing, and Infrastructure, and only those third parties who have been authorised by DM McMahon Pty Ltd to rely on this report.

The information contained in this report has been extracted from field and laboratory sources believed to be reliable and accurate. DM McMahon Pty Ltd does not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. It should be noted that the recommendations and findings in this report are based solely upon the said site location and conditions at the time of assessment. The results of the said investigations undertaken are an overall representation of the conditions encountered. The properties of the soil, vapour and groundwater within the location may change due to variations in ground conditions outside of the assessed area. The author has no control or liability over site variability that may warrant further investigation that may lead to significant design and land use changes.

Unexpected findings

If any unconsolidated, odorous, stained, or deleterious soils, or suspect bonded/friable/fibrous asbestos containing material, fuel tanks, or septic systems are encountered during any further excavation, suspected historical contaminating activities are encountered, or conditions that are not alike the above descriptions, the site supervisor should be informed, the work stopped, and this office be contacted immediately for further evaluation by an appropriately qualified environmental consultant. The unexpected findings may trigger the need for more investigation and assessment dependant on the scope and context of the unexpected finding.

Notice of Copyright

Attachment A : *Site maps and supplied proposed rezoning map*

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2023

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2023

Legend
- Boundary
- Lot 15
- Lot 2
- Lot 3

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Murray River
Pelican Blvd
Heron St
Brolga Ave
Cormorant St
Egret St
Spoonbill St
Sand Piper St
Falcon Rise
N
300 m

4. Proposed Amendment

This section of the report addresses the NSW Department of Planning and Environment (DPE) guideline *Local Environmental Plan Making Guideline* (December 2021).

4.1. Objectives and Intended Outcomes

The objective of this Planning Proposal is to amend the Murray Local Environmental 2011 to enable the land to be used for residential development, consistent with the establishing residential areas surrounding the land.

The subject land is well positioned to rely on existing services and infrastructure through the growth areas of Moama and efficiently release urban land surrounding existing and establishing developments.

An indicative subdivision plan for the future development of the subject land has been developed for the land and envisages a range of lot sizes, generally below 1,000m^2.

A key outcome of the amendment is to add to the supply of residential land in Moama and provide additional choice in location and living environments for future residents. It is intended that the development of the subject land will provide for the strong demand for residential lots in the Echuca-Moama region.

4.2. Explanation of Provisions

The intended outcomes discussed above and within this report will be achieved by amending the LEP as follows:

- Amend the Land Zoning Map as it relates to Lots 2 and 3 in DP1213161 and Lots 15 in DP1273625, from RU1 Primary Production Small Lots to R1 General Residential zone.
- Amend the Minimum Lot Size Map as it relates to Lots 2 and 3 in DP1213161 and Lots 15 in DP1273625, from a minimum lot size of 120 hectares to a minimum lot size of 500m^2.

An extract of the existing and proposed *Land Zoning and Minimum Lot Size Maps are* contained within Figures below.

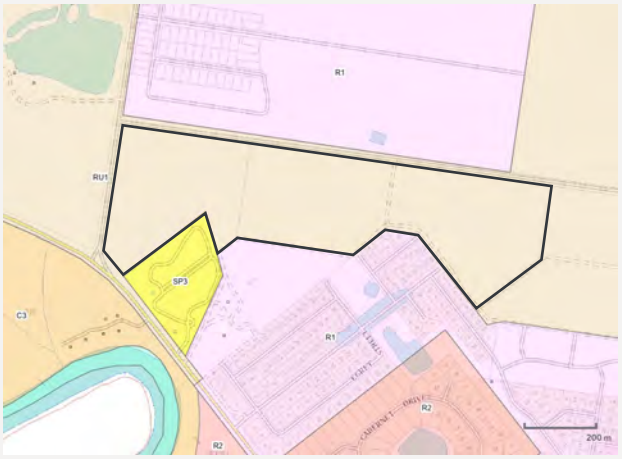

Figure 4 – Existing Land Zoning Map

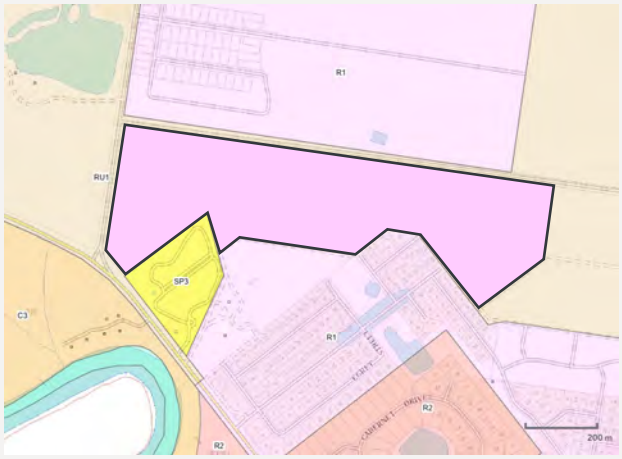

Figure 5 – Proposed Land Zoning Map

Attachment B : *Aerial photographs and satellite images*

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Aerial photograph 1961

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Spoonbill St
Pelican Blvd
Heron St
Broiga Ave
Falcon Rise
Murray River
Google Earth
Image © 2024 Maxar Technologies
N
300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Aerial photograph 1976

Legend
Boundary

Twenty Four Ln
Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Pelican Blvd
Spoonbill St
Heron St
Broiga Ave
Murray River
Falcon Rise
Sand Piper St

Google Earth
Image © 2024 Maxar Technologies

N

300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Aerial photograph 1991

Legend

Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
The Range Blvd
Perricoota Rd
Perricoota Rd
Spoonbill St
Pelican Blvd
Heron St
Brolga Ave
Sand Piper St
Falcon Rise
Murray River

Google Earth
Image © 2024 Maxar Technologies

N

300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Aerial photograph 1996

Legend
Boundary

Twenty Four Ln
Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Spoonbill St
Pelican Blvd
Heron St
Broiga Ave
Murray River
Falcon Rise
Sand Piper St

Google Earth
Image © 2024 Maxar Technologies

N
300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2002

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Spoonbill St
Pelican Blvd
Heron St
Brolga Ave
Falcon Rise
Murray River
Google Earth
Image © 2024 Maxar Technologies
N
300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2009

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
The Range Blvd
Perricoota Rd
Perricoota Rd
Spoonbill St
Pelican Blvd
Heron St
Bridge Ave
Sand Piper St
Falcon Rise
Murray River
Google Earth
Image © 2024 Maxar Technologies
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300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2014

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
The Range Blvd
Perricoota Rd
Perricoota Rd
Murray River
Spoonbill St
Pelican Blvd
Heron St
Brolga Ave
Falcon Rise
Sand Piper
N
300 m
Google Earth
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Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2016

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
The Range Blvd
Perricoota Rd
Perricoota Rd
Murray River
Heron St
Pelican Blvd
Brolga Ave
Spoonbill St
Falcon Rise
Google Earth
Image © 2024 CNES / Airbus
N
300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2018

Legend
Boundary

The Range Bvd
Twenty Four Ln
Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Spoonbill St
Pelican Bvd
Heron St
Broiga Ave
Falcon Rise
Murray River
Google Earth
Image © 2024 Maxar Technologies
N
300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2019

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
The Range Blvd
Perricoota Rd
Perricoota Rd
Spoonbill St
Pelican Blvd
Heron St
Broiga Ave
Murray River
Falcon Rise
Sand Piper

Google Earth
Image © 2024 CNES / Airbus
Image © 2024 Maxar Technologies

N
300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2020

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
The Range Blvd
Perricoota Rd
Perricoota Rd
Murray River
Spoonbill St
Pelican Blvd
Heron St
Broiga Ave
Falcon Rise
Google Earth
Image © 2024 CNES / Airbus
300 m
N

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2021

Legend

Boundary

Twenty Four Ln
Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
rricoota Rd
Perricoota Rd
Murray River
Pelican Blvd
Heron St
Brolga Ave
Spoonbill St
Sand Piper St
Falcon Rise
N
300 m
Google Earth
Image © 2024 CNES / Airbus

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2022

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Pelican Blvd
Heron St
Bridge Ave
Spoonbill St
Sand Piper St
Falcon Rise
Murray River
Google Earth
Image © 2024 Maxar Technologies
N
300 m

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2023

Legend

Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four Ln
Perricoota Rd
Perricoota Rd
Murray River
Spoonbill St
Pelican Blvd
Heron St
Broga Ave
Falcon Rise
Sand Piper

Google Earth
Image © 2024 CNES / Airbus
Image © 2024 Maxar Technologies

N

300 m

Attachment C : *Map of site features and site photographs*

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2023

Legend
Boundary

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Fill material
Filled dam
Dam
Fill material
Rubbish pile
Shed
Shed
Shed
Shed
Laydown area
Perricoota Rd
Pelican Blvd
Heron St
Bioga Ave
Cormorant St
Egret St
Sand Piper St
Falcon Rise
Murray River
Perricoota Rd
Google Earth
Image © 2024 CNES / Airbus
Image © 2024 Maxar Technologies
300 m
N

Photograph 1: Looking west along Beer Road with houses on the right.

Photograph 2: Looking east along Beer Road with houses on the left.

Photograph 3: Looking north at the intersection of Perricoota Road and Twenty-Four Lane.

Photograph 4: Looking east with the Murray River Resort on the right.

Photograph 5: Looking south with the Murray River Resort in the background.

Photograph 6: Looking south with houses in the background.

Photograph 7: The vines in the vineyard with an untreated pine post in the foreground.

Photograph 8: The poly drip irrigation system that is throughout the vineyard.

Photograph 9: A treated pine post on the right and untreated on the left.

Photograph 10: One of the pump sheds.

Photograph 11: Some liquid fertiliser (manganese and zinc) in the pump shed.

Photograph 12: Some fungicide (Mancozeb) in the pump shed.

Photograph 13: Some fungicide (Microthiold) in the pump shed.

Photograph 14: A pump shed with waste material around it including treated pine posts.

Photograph 15: Another pump shed.

Photograph 16: The inside one of the pump sheds.

Photograph 17: The undeveloped area in the centre of Lot 3.

Photograph 18: Stockpiles of fill in the undeveloped area in the centre of Lot 3.

Photograph 19: Stockpiles of fill in the undeveloped area in the centre of Lot 3.

Photograph 20: Stockpiles of fill in the undeveloped area in the centre of Lot 3.

Photograph 21: The dam in the undeveloped area in Lot 3.

Photograph 22: Stockpiles of fill on the boundary next to the Murray River Resort.

Attachment D : *Sampling map*

Beer Road and Perricoota Road Moama NSW 2731

Preliminary Site Investigation
Report No. 10167
Google Earth image 2023

Legend

- Boundary
- Sampling locations

Martin Rd
Martin Rd
Martin Rd
Martin Rd
Twenty Four Ln
Twenty Four
Perricoota Rd
Perricoota Rd
Murray River
Perricoota
Pelican Blvd
Heron St
Brolga Ave
Cormorant St
Egret St
Spoonbill St
Sand Piper St
Falcon Rise
1
2
3
4
5
6
7
8
N
300 m
Google Earth
Image © 2024 CNES / Airbus
Image © 2024 Maxar Technologies

Attachment E : *Tabulated results*

Page: 1 of 1
Job number: 10167
Project: Preliminary Site Investigation - Beer Road Moama NSW

			Sample date	23/7/24	23/7/24	23/7/24	23/7/24	23/7/24	23/7/24	23/7/24	23/7/24			**Residential A Criteria**				
			Sample location	1	2	3	4	5	6	7	8							
			Sample ID	1	2	3	4	5	6	7	8							
			Sample depth (m)	0.0-0.3	0.0-0.3	0.0-0.3	0.0-0.3	0.0-0.3	0.0-0.3	0.0-0.3	0.0-0.3							
Compound	**LOR**	**Unit**		Result	Result	Result	Result	Result	Result	Result	Result			**HILs**	**HSLs**	**ACLs**	**EILs**	**ESLs**
Arsenic	5	mg/kg		6	6	<5	5	5	5	5	5	-	-	100	-	-	100	-
Cadmium	1	mg/kg		<1	<1	<1	<1	<1	<1	<1	<1	-	-	20	-	-	-	-
Chromium	2	mg/kg		27	23	20	20	23	23	24	20	-	-	-	-	130	-	-
Copper	5	mg/kg		13	16	11	23	16	16	14	13	-	-	6000	-	190	-	-
Lead	5	mg/kg		15	18	10	13	15	14	14	12	-	-	300	-	1100	-	-
Nickel	2	mg/kg		16	15	11	12	15	20	13	13	-	-	400	-	170	-	-
Zinc	5	mg/kg		22	27	25	29	27	31	26	26	-	-	7400	-	400	-	-
Mercury	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	40	-	-	-	-
Chromium (VI)	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	100	-	-	-	-
PCBs	0.1	mg/kg		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
HCB	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	10	-	-	-	-
Heptachlor	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	6	-	-	-	-
Chlordane	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	50	-	-	-	-
Endrin	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	10	-	-	-	-
Endosulfan	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	270	-	-	-	-
Mirex	0.05	mg/kg		-	-	-	-	-	-	-	-	-	-	10	-	-	-	-
Aldrin+dieldrin	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	6	-	-	-	-
DDT+DDE+DDD	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	240	-	-	-	-
Chlorpyrifos	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	160	-	-	-	-
Atrazine	0.05	mg/kg		-	-	-	-	-	-	-	-	-	-	320	-	-	-	-
Bifenthrin	0.05	mg/kg		-	-	-	-	-	-	-	-	-	-	600	-	-	-	-
Phenols	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	3000	-	-	-	-
PAHs	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	300	-	-	-	-
Benzo(a)pyrene TEQ (half LOR)	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	3	-	-	-	0.7
TRH C6-C10 minux BTEX (F1)	10	mg/kg		-	-	-	-	-	-	-	-	-	-	-	45	-	-	180
TRH C10-C16 minus napthalene (F2)	50	mg/kg		-	-	-	-	-	-	-	-	-	-	-	110	-	-	120
TRH C16-C34 (F3)	100	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
TRH C34-C40 (F4)	100	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2800
Benzene	0.2	mg/kg		-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	50
Toluene	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	160	-	-	85
Ethylbenzene	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	55	-	-	70
Xylenes	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	40	-	-	105
Napthalene	1	mg/kg		-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
Asbestos detected	0.1	g/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Attachment F : *Laboratory reports*

Chain of Custody

DM McMahon Pty Ltd
6 Jones Street
PO Box 6318, Wagga Wagga NSW 2650
Ph: (02) 69 310 510

Turnaround Requirements: ☑ Standard TAT ☐ Non Standard or Urgent TAT (List Due Date):

Analysing Laboratory: ALS Environmental - Sydney
Project: Beer Road Moama
Order No.: 10167
Project Manager: David McMahon
Contact Ph: (02) 69 310 510
Sampling Officer: D.McMahon
Report Format: Default
Email Reports to: admin@dmmcmahon.com.au
Email Invoice to: admin@dmmcmahon.com.au

For Laboratory Use Only (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice/ Frozen ice bricks present upon sample	Yes	No	N/A
Random sample temp on receipt:			°C
Other comments:			

QUOTE NO.: EN/111/23

Lab Comments:

COC SEQUENCE NUMBER

COC:	1	2	3	4	5	6	7	8
OF:	1	2	3	4	5	6	7	8

Relinquished by:	Received by:
Date: 23/07/2024	Date: FAT 25/7/24 10:30
Signature: DM	Signature:
Relinquished by:	Received by:
Date:	Date:
Signature:	Signature:

LAB USE	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including suites (where metals are required, specify Total or Dissolved)										Additional Information
LAB ID	SAMPLE ID	DATE/TIME	MATRIX (ref below)	TYPE & PRESERVATIVE (see codes below)	TOTAL CONTAINERS	S-2 (metals)	S-12 (OCP/OPP)	W-2 (metals)								
(1)-(8)	1 to 8	23/07/2024	S	Jar	8	✓	✓									
(9)	Duplicate	23/07/2024	S	Jar	1	✓										
(10)	Rinsate	23/07/2024	W	NP	1			✓								
				TOTAL	10											

Environmental Division
Sydney
Work Order Reference
ES2424500

Telephone : +61-2-8784 8555

Matrix	Container Codes:
W - Water; S - Soil; Sed - Sediment; Sl - Sludge; A - Air; D - Dust.	P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ES2424500

CERTIFICATE OF ANALYSIS

Work Order	: **ES2424500**	Page	: 1 of 10
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Contact	: Danae Hambly
Address	: 6 JONES ST Wagga Wagga NSW, AUSTRALIA 2650	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 6931 0510	Telephone	: +61-2-8784 8555
Project	: Beer Road Moama	Date Samples Received	: 25-Jul-2024 10:30
Order number	: 10167	Date Analysis Commenced	: 26-Jul-2024
C-O-C number	: ----	Issue Date	: 31-Jul-2024 14:40
Sampler	: DAVID MCMAHON		
Site	: ----		
Quote number	: EN/111		
No. of samples received	: 10		
No. of samples analysed	: 10		

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 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.

- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	1	2	3	4	5
			Sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	ES2424500-001	ES2424500-002	ES2424500-003	ES2424500-004	ES2424500-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**14.2**	**17.4**	**14.7**	**15.4**	**15.2**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**6**	**6**	<5	**5**	**5**
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**27**	**23**	**20**	**20**	**23**
Copper	7440-50-8	5	mg/kg	**13**	**16**	**11**	**23**	**16**
Lead	7439-92-1	5	mg/kg	**15**	**18**	**10**	**13**	**15**
Nickel	7440-02-0	2	mg/kg	**16**	**15**	**11**	**12**	**15**
Zinc	7440-66-6	5	mg/kg	**22**	**27**	**25**	**29**	**27**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC - (Lindane)	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	5
				Sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		ES2424500-001	ES2424500-002	ES2424500-003	ES2424500-004	ES2424500-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	5
				Sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		ES2424500-001	ES2424500-002	ES2424500-003	ES2424500-004	ES2424500-005
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**119**	**109**	**108**	**96.0**	**85.8**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**105**	**96.0**	**82.2**	**55.8**	**83.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	6	7	8	Duplicate	----
			Sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit	ES2424500-006	ES2424500-007	ES2424500-008	ES2424500-009	--------
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**17.3**	**15.5**	**14.7**	**14.3**	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**5**	**5**	**5**	<5	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	**23**	**24**	**20**	**19**	----
Copper	7440-50-8	5	mg/kg	**16**	**14**	**13**	**14**	----
Lead	7439-92-1	5	mg/kg	**14**	**14**	**12**	**11**	----
Nickel	7440-02-0	2	mg/kg	**20**	**13**	**13**	**13**	----
Zinc	7440-66-6	5	mg/kg	**31**	**26**	**26**	**26**	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
gamma-BHC - (Lindane)	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	6	7	8	Duplicate	----
				Sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2424500-006	ES2424500-007	ES2424500-008	ES2424500-009	--------
					Result	Result	Result	Result	----
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	6	7	8	Duplicate	----
			Sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit	ES2424500-006	ES2424500-007	ES2424500-008	ES2424500-009	--------
				Result	Result	Result	Result	----
EP068B: Organophosphorus Pesticides (OP) - Continued								
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**64.1**	**119**	**130**	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**99.8**	**116**	**134**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate	----	----	----	----
				Sampling date / time	23-Jul-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2424500-010	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2424500**	Page	: 1 of 5
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Telephone	: +61-2-8784 8555
Project	: Beer Road Moama	Date Samples Received	: 25-Jul-2024
Site	: ----	Issue Date	: 31-Jul-2024
Sampler	: DAVID MCMAHON	No. of samples received	: 10
Order number	: 10167	No. of samples analysed	: 10

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, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

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)							
1, 2, 3, 4, 5, 6, 7, 8, Duplicate	**23-Jul-2024**	**----**	----	----	**29-Jul-2024**	06-Aug-2024	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
1, 2, 3, 4, 5, 6, 7, 8, Duplicate	**23-Jul-2024**	**30-Jul-2024**	19-Jan-2025	✓	**30-Jul-2024**	19-Jan-2025	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
1, 2, 3, 4, 5, 6, 7, 8, Duplicate	**23-Jul-2024**	**30-Jul-2024**	20-Aug-2024	✓	**31-Jul-2024**	20-Aug-2024	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
1, 2, 3, 4, 5, 6, 7, 8	**23-Jul-2024**	**26-Jul-2024**	06-Aug-2024	✓	**29-Jul-2024**	04-Sep-2024	✓

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
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
1, 2, 3, 4, 5, 6, 7, 8	**23-Jul-2024**	**26-Jul-2024**	06-Aug-2024	✓	**29-Jul-2024**	04-Sep-2024	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
Rinsate	**23-Jul-2024**	**30-Jul-2024**	19-Jan-2025	✓	**30-Jul-2024**	19-Jan-2025	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
Rinsate	**23-Jul-2024**	**----**	----	----	**31-Jul-2024**	20-Aug-2024	✓

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	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Pesticides by GCMS	EP068	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Pesticides by GCMS	EP068	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Pesticides by GCMS	EP068	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Total Mercury by FIMS	EG035T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	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)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

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).
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)