McMahon EARTH SCIENCE

93 CAMPBELLS LANE COOLAMON NSW 2701

PRELIMINARY SITE INVESTIGATION

FOR A PROPOSED LAND REZONING (24 LOT RESIDENTIAL SUBDIVISON)

AUGUST 2022

REPORT NO: 8791

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Report type

Preliminary Site Investigation
For a Proposed Land Rezoning
(24 Lot Residential Subdivision)

Site address

93 Campbells Lane
Coolamon NSW 2701

Report number

8791

Prepared for

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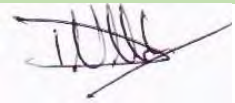
Prepared by	**David McMahon** CEnvP SC BAppSc SA GradDip WRM MEnvMgmt MALGA MEIANZ MSSA		11/08/2022	0

Contents

1.0 Executive summary

DM McMahon Pty Ltd (McMahon) conducted this Preliminary Site Investigation (PSI) at the request of Brian Pleming for a proposed land rezoning for a 24 lot residential subdivision at 93 Campbells Lane Coolamon NSW (the site). The 67.4ha site, occupied by a house and sheds, is otherwise undeveloped broadacre agricultural land. A map of the site location and a plan of the proposed subdivision can be seen in **Attachment A**.

The issue of potential contamination is required to be considered whenever a rezoning or planning proposal is presented to a planning authority where the new use may increase risk from contamination if it is present. Therefore, the purpose of this investigation is to provide Brian Pleming and the planning authority with a statement of site suitability for the proposed land use and an appropriate risk assessment framework for the management of the site during development.

The scope of work includes:

- A desktop study used to collect basic site information and identify the site characteristics.
- A detailed site inspection to complement the findings of the desktop study and site history and to identify any additional relevant site information.
- Conduct limited sampling using Data Quality Objectives to assess the need for further investigation.
- From the information collected, develop a Conceptual Site Model detailing the potential contamination source-pathway-receptor linkages.
- Conduct a risk assessment for site suitability regarding potential contamination and the proposed development.
- Provide a statement of site suitability for the proposed land use and recommendations for further investigation, assessment, and site management if required.

Findings of the investigation include the identification and assessment of the following potential contamination sources:

- Persistent chemicals that could have accumulated in the soil across the farm, around the silos, chemical storage areas, and sheep yards from pesticide and agricultural chemical use. Soil sampling of these areas returned results that are assessed to be a low risk to current and future site users. Ecological exceedances for zinc were found around the sheep yards that will require remediation, these exceedances are likely to be surficial and localised. Validation sampling is required around the yards once the infrastructure and surficial soil is removed.
- Machinery maintenance and associated potential fuel/oil storage in and around the existing machinery shed. Further investigation is required in this area once the shed has been removed and an unexpected finds protocol is recommended to be developed around potential fuel storage.
- Remnants of hazardous building material (asbestos and lead paint) around the demolished house and garage. Some intact fragments of bonded asbestos containing material was found within the demolished house and garage footprint and this will require further investigation and remediation.

- The potential septic system from the demolished house. Further investigation is recommended, and this can be managed during development.
- The filled farm dam on site will require further investigation to assess the type and nature of the fill material. No other filled gullies or dams were observed but these are common on farmland in erosional landscapes. An unexpected finds protocol is recommended to be developed around this.

In summary, McMahon assesses there is no gross soil contamination across the proposed subdivision site from the historical and current agricultural land use. The other potential contamination sources identified are localised and do not preclude the rezoning or subdivision of the site, however, will be necessary to assist in the preparation of detailed development plans for site suitability specific to any future development. Owing to the latent nature of the localised potential contamination sources identified, McMahon assesses that these can be managed during development.

A protocol for unexpected finds as outlined in **Section 12.0** has also been developed as part of this risk assessment framework if additional potential contamination sources are identified during planning or development. This executive summary and the findings of this PSI are subject to the limitations as stated in **Section 13.0**.

2.0 Objectives

The objective of this investigation is to:

- Provide information regarding potential contamination on site.
- Provide a factual record of the works completed and results.
- Undertaking a risk assessment for health risk to future site users and the environment.
- Provide a statement of recommendations for further investigation and/or site management or alternatively, suitability of the site for the proposed rezoning and land use.
- To prepare the PSI in general accordance with the relevant guidelines and legislation, namely:
    - NSW EPA. Consultants Reporting on Contaminated Land: Contaminated Land Guidelines, (2020).
    - State Environmental Planning Policy No 55 – Remediation of Land, (1998).
    - National Environment Protection (Assessment of Site Contamination) Measure (NEPM), (2013).

3.0 Scope of work

The scope of work includes the following:

- Review the available information regarding historical, current, and proposed land use of the site and surrounds.
- Review the environmental setting of the site and surrounds.
- Assess the potential contamination sources and chemicals of potential concern.
- Conduct limited sampling to assess the need for further investigation.
- Assess the potential contamination source-pathway-receptor linkages from the chemicals of potential concern, environmental setting, and land use.
- Develop a conceptual site model to assess potential contamination risk from the source-pathway-receptor linkages.
- Provide a clear statement on site suitability for the present and future land use and the need for further investigation and/or site management.

4.0 Site identification

The site identification and details are as follows.

- Address: 93 Campbells Lane Coolamon NSW 2701.
- Real property description: Lot 21 DP 1224134.
- Site centre co-ordinate: 519400E 6149500N MGA GDA z55.
- Property size: 67.4ha (approx.).
- Owner: Brian Michael and Debra Ann Pleming.
- Local Government Area: Coolamon Shire Council.
- Current Zoning: RU1 Primary Production.
- Present use: Agriculture.
- Proposed use: Residential subdivision.
- Development Application reference: To be advised.

5.0 Site history

From research of the available resources, the following site history is offered.

Historical owners and occupiers

- Crown Land.
- 1911 Granted to The Rural Bank of NSW from the Crown.
- 1944 Transfer from the Rural Bank of NSW to Vernon Bartlett (farmer).
- 1955 Transfer to James Campbell from Vernon Bartlett.
- 1958 Transfer to John Campbell (farmer) from James Campbell (deceased).
- 2006 Transfer to Brian Pleming from John Campbell.

Council records

A formal access request was lodged with Council for any information relating to the site history or potential contamination and two records were found:

- An approved Development Application (DA23/2014) for a new residence and to demolish/remove an old house.
- An approved Development Application (DA16/2016) for a proposed 3 stage 20 lot rural subdivision.

Section 10.7

A Section 10.7 Planning Certificate (Certificate No: 17/2023) was obtained from Council on 3 August 2022 and the certificate states the land is not listed on the state register for significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.

EPA records

There are no records on the Contaminated Land Record Database for the site pertaining to Preliminary Investigation Orders, Declaration of Significantly Contaminated Land, Approved Voluntary Management Plans, Management Orders, Ongoing Maintenance Orders, Repeal Revocation or Variation Notice, Site Audit Statement, or Notice of Completion or Withdrawal of Approved VMP. The site or adjacent properties have not been “notified” to the EPA on the list of NSW Contaminated sites as of July 2022.

Internet search

- Coolamon Shire Council DA2018/82 - 93 Campbells Lane Coolamon – Extension to Entertainment Area.
- Coolamon Shire Council DA2019/51 - 93 Campbells Lane Coolamon – Construction of Dam.

Aerial photographs and satellite images

1961 – A house, garage, and sheds that are surrounded by trees can be seen off Campbells Lane. The paddocks surrounding the house are undeveloped other than some fence lines and two farm dams. Surrounding land use is broad acre agricultural.

1978 – No change to 1961.

1987 – No change to 1978.

1991 – No change to 1987.

1994 – No change to 1991.

2007 – No change to 1994.

2012 – No change to 2007.

2013 – No change to 2012.

2015 – A new house has been built to the north east of the old house and a new driveway constructed to it.

2017 – One of the farm dams has been partially filled (in the centre west of the farmed paddocks) and earthworks for a new dam on the northern boundary have commenced. Earthworks for the adjacent 3 stage 20 lot rural subdivision has commenced with roads being partially constructed.

2018 – The old house and garage have been demolished and the dam (in the centre west of the farmed paddocks) has been filled and farmed over. Houses have been built on the adjoining lots and the earthworks for the subdivision roads has been completed. The new dam on the northern boundary has been constructed and is full of water.

2019 – No change to 2018.

2020 – Another new dam has been built on the northern boundary to the west of the one constructed in 2017-2018. More houses have been built on the adjoining lots.

2021 – No change to 2020 other than a new steel garage has been built on site to the west of the new house and more houses have been built on the adjoining lots.

The aerial photographs and satellite images can be seen in **Attachment B**.

6.0 Site condition and surrounding environment

McMahon notes the following observations of the site condition as part of this PSI.

- The site is bound by Bartletts Lane to the north, Campbells Lane to the east, Davies Drive to the west, and large lot residential land to the south that is accessed off Campbells Lane (Campbells Lane dog legs to the west to the Rannock Road).
- Access is off Campbells Lane to the south through the large lot residential land.
- Surrounding land use is broad acre agriculture to the north and east, large lot residential to the south and west, and a state forest to the south east.
- The site is split into three paddocks, two that are farmed (61ha) and a house paddock (around 6ha). The farmed paddocks are sown to oats and brassica as a grazing crop.
- There is a dam in the western extent of the house paddock.
- There are also two new dams in the farmed paddocks on the northern boundary, these constructed between 2017 and 2020.
- There is a filled dam in the centre west of the farmed paddocks, this being filled in 2017 and 2018.
- Within the house paddock there is:
    - a slab on grade new brick veneer house that was built in 2015 with a septic system to the east.
    - A slab on grade new steel garage that was built in 2021.
    - The footprint of a recently demolished house and garage to the south west of the new house. The footprint was recognisable owing to disturbed soil and some remnants of building material such as wood, glass, building material, and bonded Asbestos Containing Material (ACM) fragments. Around ten bonded ACM fragments (25-50mm) were observed on the surface in and around the demolished house and garage, but thick grass hampered a through visual inspection of the entire footprint.
    - A wooden framed steel shed with some household items stored in it.
    - A wooden framed steel machinery shed with a trailer, some hay, and machinery parts stored in it.
    - Two steel silos, one slab on grade and one portable (which appears to have been placed many years ago).
    - A wooden and steel framed steel wool shed with one shearing stand with agricultural chemicals stored next to the doors on the northern and eastern side.
    - Some new sheep yards to the west of the wool shed with steel panel fencing and a concrete race.
    - The remnants of some old sheep yards with only a concrete race remaining.

Maps of the site features can be seen in **Attachment C**.

Site photographs can be seen in **Attachment D**.

A summary of the site environmental setting is as follows.

Topography

The site is located at an elevation range of approximately 235-245 mAHD on a north east trending very gently inclined footslope formed on recent Quaternary colluvium underlain by Ordovician metasediments.

Vegetation

The site is extensively cleared woodland with an oats and brassica based pasture land cover over much of the site.

Natural Resources Sensitivity

A search of the Coolamon Local Environment Plan (2011) found that the site is not in a biodiversity, natural resources, or water resources mapped area.

Weather

Annual rainfall is around 510mm, with the wettest months being June, July, and October. Coolamon is characterised by cold wet winters and hot dry summers with rainfall exceeding evaporation only in the winter months.

Hydrology

There are no defined drainages on site, but an ephemeral first order tributary of Boggy Creek lies around 400m to the east. Runoff from rainfall is captured in the three farm dams on site and the runoff regime has been altered by the adjoining residential development. The site is mapped as not being in a Flood Planning Area.

Soil

Soils comprise of moderately deep and moderately well drained red-brown earths. These soils lie within a transferral landscape consisting of mostly eroded parent materials washed from areas directly upslope.

Geology

The local geology is Ordovician metasediments associated with the Wagga Group consisting of siltstone, sandstone, quartz mica schist, minor graphite schist and hornfels.

Hydrogeology

Groundwater is not a resource in the locale but is likely to exist as deep low productivity aquifers in the underlying geology.

7.0 Sampling and analysis quality plan and sampling methodology

The Data Quality Objectives (DQOs) of the site assessment 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). These DQO's are as follows:

1. **The problem**
2. **The goal of the study**
3. **Information inputs**
4. **Study boundaries**
5. **The analytical approach**
6. **Performance and acceptance criteria**
7. **Obtaining data**

These objectives have been further outlined in the following sections.

DQO 1 - The problem

Potential contamination from previous land use may be present across the site and insufficient data relating to this source is available to determine land use suitability and the need for further investigation with the necessary level of confidence.

DQO 2 - The goal of the study

Goals of the study include:

- Undertake limited investigations based on the data gaps to determine if there is agricultural chemical contamination within the soil associated with the identified contamination sources.
- Determine if any contamination, should it be identified, poses a risk to current and/or future receptors at the site or within potential exposure pathways from the site, and if further investigation is required.
- Determining whether the site is currently, or can be made, suitable for the proposed development regarding contamination.

DQO 3 - Information inputs

- Desktop data including site inspections, site condition, history, geology, hydrogeology, and laboratory analysis to characterise the site.
- Observational data including visual and olfactory conditions obtained from the sampling.
- Analytical data relative to the assessment criteria.

DQO 4 - Study boundaries

- Intrusive investigation across the site.
- Temporal boundaries are limited to the proposed fieldwork timeframes in the third quarter of the year 2022.

DQO 5 - The analytical approach

Samples will be tested for heavy metals and organochlorine and organophosphate pesticides that may be persistent in the soil from the sites historical agricultural land use.

DQO 6 - Performance and acceptance criteria

Specific limits for the investigation are in accordance with the appropriate guidance made or endorsed by state and national regulations, appropriate indicators of data quality, and industry standard procedures for field sampling and handling. To assess the validity of data for decision making, the data is assessed against a set of data quality indicators, the following predetermined data quality indicators have been adopted.

The key decision rules for the investigation are:

1) Has the analytical data been collected as part of the testing and met the data quality indicators? If they have then the data can be used to answer the decision rule/s and the decision statements developed in Step 2 of the DQOs. If not, then the need to collect additional data may be required.
2) Do contaminant concentrations exceed the investigation and screening criteria? If not, then the potential contamination does not pose an above low level of risk. Where results exceed the investigation and screening criteria, this may indicate an unacceptable level of risk. Further risk assessment and investigations may be warranted to determine the potential for impacts.

The key decision errors for the investigation are:

i. deciding that the site is contaminated when it truly is not.
ii. deciding that the site is not contaminated when it truly is.

The true state of nature for decision error (i) is that the site is not contaminated.
The true state of nature for decision error (ii) is that the site is contaminated.

The site assessment criteria were specifically derived and incorporate the following:

- The samples are not composited so the direct reading of contaminant levels will be found from each sample point on which an appropriate decision can be based off.
- The duplicate sample should have a Relative Percentage Difference (RPD) of <30%.
- The rinsate sample should return negligible concentrations for all parameters tested to ensure an appropriate sampling and decontamination procedure.
- If contaminant levels exceed the Tier 1 and statistical assessment criteria further investigation, assessment and management may be required.

Specific Tier 1 assessment criteria can be seen below, **Table 1**.

Table 1: *Assessment criteria*

Material	Analytes	Criteria
Soil	Heavy metals Pesticides	**Health Investigation Levels (HILs)** -Residential A NEPM (2013) -Table 1A(1) Heavy metals and pesticides -Soils within 3m of surface **Added Contaminants Limits (ACLs)** -Residential A NEPM (2013) -Table 1B(1) Zinc -Table 1B(2) Copper -Table 1B(3) Nickel -Table 1B(4) Lead -Soils within 2m of surface -pH of 6.0 ($CaCl_2$) and CEC of 10 assumed from local knowledge **Environmental Investigation Levels (EILs)** -Residential A NEPM (2013) -Table 1B(5) Arsenic and pesticides -Soils within 2m of surface **Ecological Screening Levels (ESLs)** -Residential A NEPM (2013) -Clay soils within 2m of surface

The Tier 1 assessment criteria are used as an initial screening of the data to determine whether further assessment is required. Where above criteria exceedance indicates a risk to human health or the environment, site specific risk assessment, management or remediation will be recommended as appropriate.

DQO 7 - Obtaining data

The sampling pattern and strategy identifies the occurrence of potential contamination for suitable site characterisation. The sampling pattern and strategy has been devised based on site history, land uses, aerial imagery, site inspections, previous investigations and the NEPM (2013). The sampling pattern has been described in more detail below.

Sampling strategy and pattern

A judgemental sampling pattern has been chosen based on potential contamination sources, previous land use, and requirements to delineate potential contamination. The adopted sampling pattern is suitable to make a quantitative statement about the level of confidence regarding the quality and accuracy of results. McMahon assesses that the sampling pattern is suitable to be used for decision making and site characterisation.

Key features of the sampling pattern include:

- 12 judgemental soil sample locations taken across the site. Samples will be analysed for heavy metals and pesticides (organochlorines and organophosphates).
- One soil duplicate sample.
- One soil rinsate sample.

By reference to the DQOs, maps of the investigation locations can be seen in **Attachment E**.

Sampling design justification

- Sample points 1-6 - to assess the near surface soil contamination from potential persistent agricultural chemicals in the paddocks from diffuse broadacre application.
- Sample points 7 & 12 - to assess the near surface soil contamination from potential persistent agricultural chemicals around the two silos where grain treatment may have occurred.
- Sample points 8 & 9 - to assess the near surface soil contamination from potential persistent agricultural chemicals around the two chemical storage areas where boom spray mixing and washing out may have occurred.
- Samples point 10 & 11 - to assess the near surface soil contamination from potential persistent agricultural chemicals around the races in the sheep yards (old and new) where lice and footrot treatment may have occurred.

Failure to meet objectives procedure

If the procedures undertaken do not satisfy the expected data quality objectives, a review of the sampling plan will be conducted prior to any further works.

Sampling and analysis methodology

The sampling officer wore unused disposable nitrile gloves to extract samples directly from the excavated pit to place into appropriately preserved sample receptacles. Collected sample containers were placed into a chilled esky for preservation prior to analysis. All in-field observations and any relevant comments are detailed in the field sheets and a Chain of Custody form was produced to accompany the samples to the laboratory.

Sampling standards

Sampling was 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.
- AS 4482.2:1999 - Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances.

8.0 Results

Sampling for this PSI was conducted over one day on 3 August 2022. The weather was fine and cool. A summary of the field observations and sample analytical results are as follows.

Soil and site surface

- Soils in the farmed paddocks were characterised by red brown topsoils overlying red brown clay loams.
- Soils in the house paddock were like those in the farmed paddocks but with less topsoil in areas of high traffic (around the sheds, yards, and silos).
- There were no visual or olfactory indicators of chemical contamination in the farmed paddocks or the house paddock.
- Some bonded ACM fragments (ten pieces 25-52mm) were observed on the soil surface around the demolished house and garage. These bonded ACM fragments pieces were in sound condition with no weathering or breakdown into fibres observed. More bonded ACM fragments in and around the demolished house and garage footprint are likely but thick grass hampered a thorough visual inspection.

Soil analysis

- Heavy metals are below the Limits of Reporting (LORs) and/or the adopted criteria except for zinc at samples points 10 (2,750mg/kg) and 11 (1,270mg/kg) which are above the Added Contaminant Limit (the ecological criteria) of 400mg/kg. These sample points are around the new and old sheep yards and the zinc is likely a residue from the footrot treatment of sheep (zinc sulphate). The coefficient of variation for the zinc results was high (2.1), suggesting these data are heterogenous and the two readings at sample points 10 and 11 are not representative of the wider site. The zinc levels are below the Residential A (garden accessible soil) criteria for the protection of human health.
- Pesticides are below LORs and the adopted criteria.

Surface water

- The surface water in the dams was slightly turbid from recent rainfall but otherwise clear with no slicks, sheens nor evidence of potential contamination noted.

Tabulated results and the statistical analysis can be seen in **Attachment F**.

Laboratory reports can be seen in **Attachment G**.

9.0 Quality assurance/quality control data evaluation

To assess the validity of data for decision making, the data has been assessed against a set of Data Quality Indicators (DQIs), the following predetermined DQIs have been adopted, **Table 2** and **Table 3**.

Table 2: *Sampling Data Quality Indicators*

Adopted practices	Completeness	Comparability	Representativeness	Precision	Accuracy
Details of sampling team – David McMahon (Experienced consultant).	✓	✓			
Reference to sampling plan/method, including any deviations from it – sampling and analysis quality plan.	✓				
Decontamination procedures carried out between sampling events.			✓	✓	✓
Logs for each sample recorded, including date, time, location (with GPS coordinates), sampler, duplicate samples, chemical analyses to be performed, site observations and weather/environmental (i.e. surroundings) conditions. Include any diagrams, maps, photos.		✓	✓		
Chain of Custody fully identifying – for each sample – the sampler, nature of the sample, collection date, analyses to be performed, sample preservation method, departure time from the site and dispatch courier(s) (where applicable).	✓	✓			
Field quality assurance/quality control results (rinsate).				✓	✓
Statement of duplicate and other QAQC sample frequencies – 1 per 20 samples for duplicates, 1 per sampling event for rinsate.			✓	✓	
Field instrument calibrations (when used) with supporting documentation.				✓	✓
Sampling devices and equipment appropriate to sampling requirements.	✓	✓			

Table 3: *Analysis Data Quality Indicators*

Adopted practices	Completeness	Comparability	Representativeness	Precision	Accuracy
A copy of signed Chain of Custody forms acknowledging receipt date and time, and identity of samples included in shipments.	✓	✓			
Analytical methods used, including any deviations.	✓	✓			
Calculation of Relative Percentage Difference for duplicate comparison.	✓	✓			✓
Laboratory accreditation for analytical methods used, also noting any methods used which are not covered by accreditation.	✓			✓	
Surrogates and spikes used throughout the full method process, or only in parts. Results are corrected for the recovery.	✓	✓			
A list of what spikes and surrogates were run with their recoveries and acceptance criteria.		✓			✓
Practical quantification limits (PQL).	✓	✓			
Laboratory duplicates and rinsate results.	✓				✓
Evaluation of all quality assurance/control information listed above against the stated data quality objectives, including a quality assurance/control data evaluation.	✓	✓	✓	✓	✓

Data quality objectives

The soil duplicate sample (8791/12) returned an average Relative Percent Difference (RPD) of less than 30%.

The rinsate sample returned results less than the LOR.

The laboratory results returned no outliers for quality control samples, analysis holding time compliance, nor frequency of quality controls samples.

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 field and analytical data is of a suitable quality to determine contamination risk with an appropriate level of confidence.

10.0 Conceptual site model

A conceptual site model is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors and is presented and follows.

Summary

The site has been used for farming and grazing agriculture with associated infrastructure as far as records can ascertain. Chemicals associated with agriculture, machinery maintenance and septic systems may have accumulated in the soil as well as hazardous building materials from demolished buildings. Receptors include future construction workers, residents, and the environment. Pathways are from soil disturbance during development and occupation. Short to medium-term soil contact is likely for future construction workers, and long-term soil contact is possible for future occupants.

Potential and known sources of contamination

- Persistent agricultural chemicals.
- Fuel and oil.
- Septic system.
- Hazardous building materials.
- Fill from an unknown source in the filled dam.

List of chemicals of potential concern

From the potential contamination sources, the Chemicals of Potential Concern (COPCs) are as follows:

- Heavy metals and pesticides.
- Hydrocarbons, solvents, semi-volatile organic compounds.
- Asbestos and lead.

Mechanism of contamination

The mechanism of contamination is predominantly top-down vertical and lateral migration into soil. Asbestos fibres can be released from bonded ACM when disturbed. Run off from soil may impact surface waters.

Potentially affected environmental media

- Soil.
- Surface water.
- Groundwater is unlikely to be impacted owing to the deep depths.

Consideration of spatial and temporal variations

Spatial variation in potential contamination is possible. Temporal variation is unlikely owing to the aged nature of potential contaminants.

Actual or potential exposure pathways

- Direct skin contact with soil for future construction workers, and future on-site occupants.
- Inhalation and/or ingestion of soil, vapour, and dust.
- Direct surface water contact.
- Groundwater ingestion, however, the site is connected to town water.

Human and ecological receptors

- Future on-site users.
- Construction workers.
- Domestic groundwater users. No domestic groundwater bores currently exist on site.
- Down gradient ecological receptors.
- Future landscaping and ecological receptors.

Frequency of exposure

- Construction workers are assessed to be a short-term exposure risk.
- Future on-site users are assessed to have a long-term exposure risk.
- Future groundwater users are a medium to long-term exposure risk.
- Ecological receptors are assessed to be a medium to long-term exposure risk.

Source pathway receptor linkage assessment

- Future on-site construction workers have a risk of contact with potentially contaminated soil in the house paddock during construction and maintenance.
- Future on-site users have a risk of dermal contact with potentially contaminated soil in the house paddock during maintenance.
- Future on-site users have a risk of inhalation of potentially contaminated soil and dust in the house paddock.
- Domestic groundwater use is unlikely as the site and surrounds are connected to reticulated town water.
- On site ecological receptors are limited at present but this could change with landscaping and residential land use.
- There is a low risk to down gradient ecological receptors from the migration of potentially contaminated surface water and groundwater if gross soil contamination is found.
- The site is assessed to be suitable for the rezoning given the adoption of the recommended site management strategies during development.

Discussion of multiple lines of evidence

A multiple lines of evidence approach is the process for evaluating and integrating information from different sources of data and uses best professional judgement to assess the consistency and plausibility of the conclusions which can be drawn, NEPM (2013).

Definitive information concerning the sources of potential contamination on site is satisfactory therefore the risk assessment will rely heavily on the information provided by this PSI and will be supplemented by data collected during sampling.

11.0 Conclusions and recommendations

This PSI met the objective of investigating and assessing potential contamination and providing a statement of site suitability for the proposed land use and an appropriate risk assessment framework for the management of the site during rezoning and development.

The results of the investigation conclude that the identified potential contamination sources are assessed to be of low significance in terms of risk to current site users owing to their localised and latent nature but are required to be managed during development.

The lack of quantitative soil contamination data in this PSI around the identified potential contamination sources is considered to not preclude the rezoning or subdivision of the site, however, will be necessary to assist in the preparation of site management plans.

This PSI also provides the framework for developing management plans around the potential contamination sources by identifying the potential contamination sources, potentially impacted media, and chemicals of potential concern.

Unexpected finds are possible during rezoning and development and can be managed under an unexpected finds protocol as outlined in **Section 12.0**. These unexpected finds include but are not limited to:

- Buried or surface bonded asbestos containing material, asbestos fines/friable asbestos.
- Underground services containing asbestos.
- Building waste and rubbish.
- Buried organic materials.
- Stained or deleterious soils.
- Malodorous soils.
- Ashy deposits.

The developer is responsible for tracking the soil and fill material on and off site and the following site management is recommended:

- Material generated from the site:
    - The underlying natural subsoil in the farmed paddocks meets the Virgin Excavated Natural Material (VENM) classification and can be handled accordingly.
    - Material generated from around the demolished house and garage, existing sheds, and yards within the house paddock is to be subject to a waste classification in line with the NSW EPA (20140 Waste Classification Guidelines.
    - Further assessment is required on the material in the filled dam.
- Fill material imported to site:
    - Must meet the requirements of the NSW EPA (2014) Excavated Natural Material Order or be classified as VENM.
    - Other acceptable materials are quarried soil-like materials and construction materials which are commercial products available to the construction industry.

Information qualifying such products should include the product specification and inspection records confirming that the material is consistent with the related specification.

This executive summary and the findings of this PSI are subject to the limitations as stated in **Section 13.0**.

12.0 Unexpected findings

If any unconsolidated, odorous, stained, or deleterious soils are encountered during any further excavation, hazardous building materials or suspected historical contaminating activities are encountered, or conditions that are not alike the above descriptions, this office is required to 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.

13.0 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 Brian Pleming 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.

14.0 Notice of Copyright

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15.0 Attachments

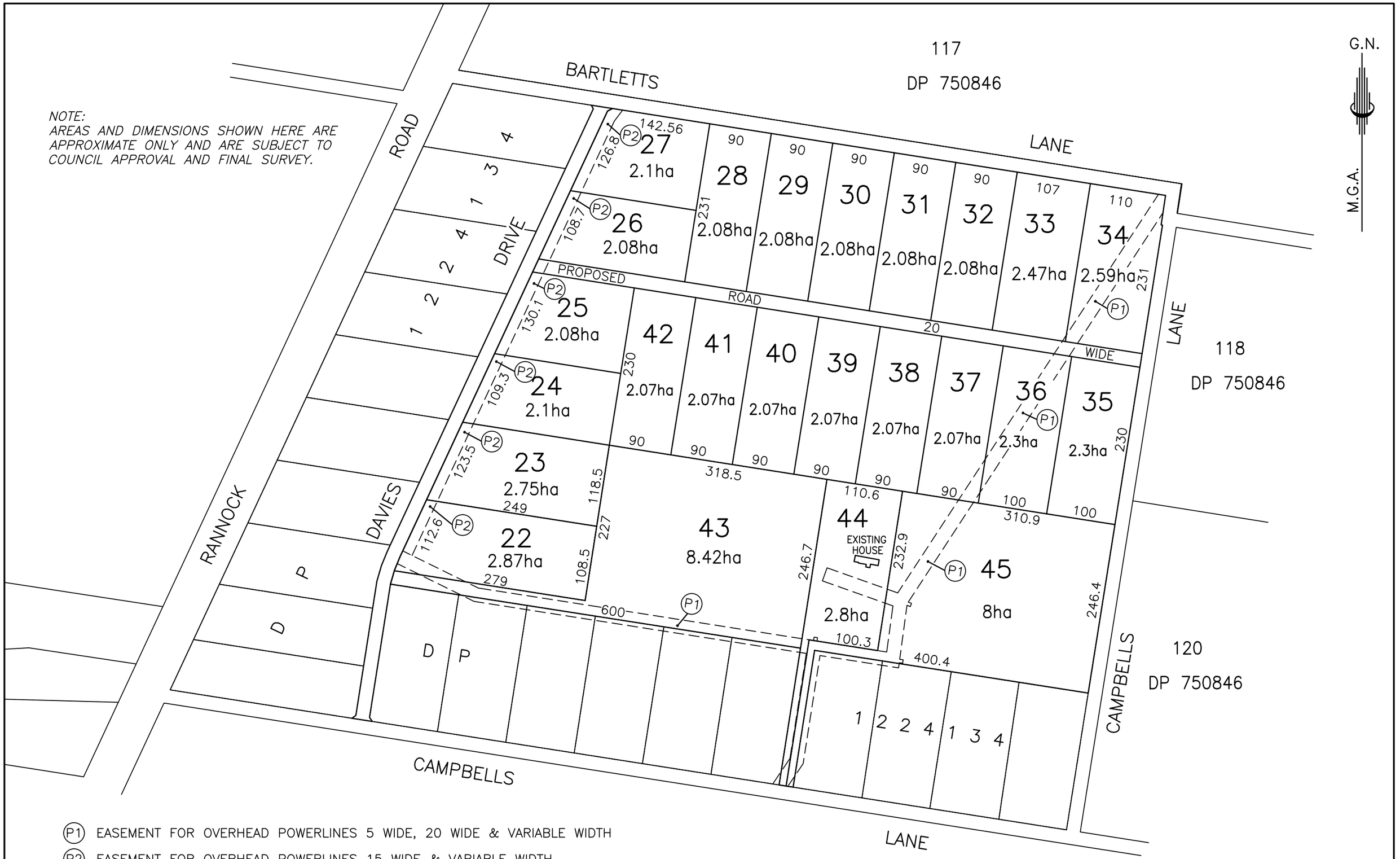
A. Site map and development plan	2 pages
B. Aerial photographs	14 pages
C. Site features	2 pages
D. Site photographs	10 pages
E. Sampling maps	2 paged
F. Tabulated results	2 pages
G. Laboratory reports	23 pages

Attachment A : *Site plan*

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2021

NOTE:
AREAS AND DIMENSIONS SHOWN HERE ARE APPROXIMATE ONLY AND ARE SUBJECT TO COUNCIL APPROVAL AND FINAL SURVEY.



(P1) EASEMENT FOR OVERHEAD POWERLINES 5 WIDE, 20 WIDE & VARIABLE WIDTH

(P2) EASEMENT FOR OVERHEAD POWERLINES 15 WIDE & VARIABLE WIDTH

L.G.A.: COOLAMON	Scale: 1: 5000 (A3)	PROPOSED SUBDIVISION OF LOT 21 DP 1224134 BARTLETTS LANE & DAVIES DRIVE COOLAMON FOR: BRIAN PLEMING	T.J. HINCHCLIFFE & ASSOCIATES PTY. LTD. CONSULTANTS IN SURVEYING, PLANNING AND DEVELOPMENT	Date: 27 APRIL 2022
Locality: COOLAMON	Datum: Origin:		ACN 003 619 725 ABN 18 003 619 725 33 Blake Street, Wagga Wagga, N.S.W. 2650 P.O. Box 5497 Wagga Wagga, N.S.W. 2650 Phone: 02 6931 7099 Mobile: 0402 009 795 Email: admin@waggasurveyors.com.au	Reference: 22222 v2

Attachment B : *Aerial photographs and satellite images*

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Aerial photograph 1961

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Aerial photograph 1978

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Aerial photograph 1987

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Aerial photograph 1991

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Aerial photograph 1994

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2007

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2012

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2013


93 Campbells Lane Coolamon NSW
Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2015
Legend
Boundary
Bartletts Ln
Bartletts Ln
Maxwell Dr
Rannock Rd
Campbells Ln
Google Earth
Image © 2022 CNES / Airbus
N
600 m

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2017

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2018

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2019

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2020

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2021

Attachment C : *Site features maps*

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2021

93 Campbells Lane Coolamon NSW

Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2021

Attachment D : *Site photographs*

Photograph 1: The site access of Campbells Lane through the large lot residential land.

Photograph 2: The oats and brassica crop in the paddocks.

Photograph 3: The dam in the western extent of the house paddock.

Photograph 4: The new dam on the northern boundary of the site.

Photograph 5: The other new dam on the northern boundary of the site.

Photograph 6: The site of the filled dam.

Photograph 7: The new house.

Photograph 8: The septic connected to the new house.

Photograph 9: The new garage.

Photograph 10: The demolished house and garage site in the foreground.

Photograph 11: An ACM fragment on the demolished house and garage site.

Photograph 12: The wooden framed steel shed.

Photograph 13: The wooden framed steel machinery shed.

Photograph 14: The slab on grade steel silo.

Photograph 15: The portable steel silo.

Photograph 16: The wool shed.

Photograph 17: The agricultural chemicals stored next to the northern door of the wool shed.

Photograph 18: The agricultural chemicals stored next to the eastern door of the wool shed.

Photograph 19: The new sheep yards next to the wool shed.

Photograph 20: The remnants of some old sheep yards.

Attachment E : *Sampling maps*


93 Campbells Lane Coolamon NSW
Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2021
Bartletts Ln
Legend
Dam
Filled dam
House paddock
New dam
Sample point
1
2
3
4
5
6
7
8
9
10
11
12
Google Earth
Image © 2022 Maxar Technologies
N
300 m


93 Campbells Lane Coolamon NSW
Preliminary Site Investigation - August 2022
Report No. 8791
Satellite image 2021
Legend
Dam
Filled dam
House paddock
New dam
Sample point
5
12
9
7
10
8
6
11
Google Earth
Image © 2022 Maxar Technologies
N
100 m

Attachment F : *Tablulated results*

Job number: 8791
Project: Preliminary Site Investigation - 93 Campbells Lane Coolamon NSW

																Residential A Criteria				
			Sample date	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22	3/8/22					
			Sample location	1	2	3	4	5	6	7	8	9	10	11	12					
			Sample ID	8791/1	8791/2	8791/3	8791/4	8791/5	8791/6	8791/7	8791/8	8791/9	8791/10	8791/11	8791/12					
			Sample depth (m)	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3					
Compound	**LOR**	**Unit**		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	**HILs**	**HSLs**	**ACLs**	**EILs**	**ESLs**
Arsenic	5	mg/kg		5	<5	<5	6	6	5	5	5	6	<5	9	<5	100	-	-	100	-
Cadmium	1	mg/kg		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	20	-	-	-	-
Chromium	2	mg/kg		26	24	21	29	44	30	28	33	29	24	36	26	-	-	400	-	-
Copper	5	mg/kg		8	8	6	8	7	8	11	16	18	11	13	10	6000	-	190	-	-
Lead	5	mg/kg		9	8	7	10	11	13	20	84	191	133	18	12	300	-	1100	-	-
Nickel	2	mg/kg		8	7	6	8	8	7	6	8	9	8	10	7	400	-	170	-	-
Zinc	5	mg/kg		16	18	14	17	16	34	126	226	214	2750	1270	33	7400	-	400	-	-
Mercury	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	40	-	-	-	-
HCB	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<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	<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	<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	<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	<0.05	<0.05	<0.05	<0.05	270	-	-	-	-
Methoxychlor	0.05	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	300	-	-	-	-
Aldrin+dieldrin	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<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	<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	<0.05	<0.05	<0.05	<0.05	160	-	-	-	-

Job number: 8791
Project: Preliminary Site Investigation - 93 Campbells Lane Coolamon NSW

Summary statistics

Compound	LOR	Unit	No.	Range	Median	Mean	SD	CV	95% UCL
Arsenic	5	mg/kg	12	5-9	5.0	5.6	1.2	0.2	6.2
Cadmium	1	mg/kg	12	1	1	1	-	-	-
Chromium	2	mg/kg	12	21-44	28.5	29.2	6.2	0.2	32.4
Copper	5	mg/kg	12	6-18	9.0	10.3	3.7	0.4	12.3
Lead	5	mg/kg	12	7-191	12.5	43.0	60.7	1.4	74.5
Nickel	2	mg/kg	12	6-10	8.0	7.7	1.2	0.2	8.3
Zinc	5	mg/kg	12	14-2750	33.5	394.5	821.5	2.1	820.4
Mercury	0.1	mg/kg	12	0.1	0.1	0.1	-	-	-

Attachment G : *Laboratory reports*

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2227634**	Page	: 1 of 10
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Contact	: Customer Services ES
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	: 93 Campbells Lane Coolamon - PSI	Date Samples Received	: 04-Aug-2022 11:30
Order number	: 8791	Date Analysis Commenced	: 06-Aug-2022
C-O-C number	: ----	Issue Date	: 09-Aug-2022 18:07
Sampler	: D. McMahon		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 14		
No. of samples analysed	: 14		

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.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	8791/1	8791/2	8791/3	8791/4	8791/5
			Sampling date / time	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2227634-001	ES2227634-002	ES2227634-003	ES2227634-004	ES2227634-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	15.8	18.4	17.6	15.1	14.2
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	<5	<5	6	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	26	24	21	29	44
Copper	7440-50-8	5	mg/kg	8	8	6	8	7
Lead	7439-92-1	5	mg/kg	9	8	7	10	11
Nickel	7440-02-0	2	mg/kg	8	7	6	8	8
Zinc	7440-66-6	5	mg/kg	16	18	14	17	16
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	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
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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	8791/1	8791/2	8791/3	8791/4	8791/5
			Sampling date / time	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2227634-001	ES2227634-002	ES2227634-003	ES2227634-004	ES2227634-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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
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	%	**87.6**	**129**	**78.4**	**73.0**	**93.3**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**86.6**	**125**	**76.6**	**71.1**	**93.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	8791/6	8791/7	8791/8	8791/9	8791/10
			Sampling date / time	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2227634-006	ES2227634-007	ES2227634-008	ES2227634-009	ES2227634-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	8.9	13.2	20.7	10.4	16.8
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	5	5	6	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	30	28	33	29	24
Copper	7440-50-8	5	mg/kg	8	11	16	18	11
Lead	7439-92-1	5	mg/kg	13	20	84	191	133
Nickel	7440-02-0	2	mg/kg	7	6	8	9	8
Zinc	7440-66-6	5	mg/kg	34	126	226	214	2750
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	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
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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	8791/6	8791/7	8791/8	8791/9	8791/10
			Sampling date / time	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	ES2227634-006	ES2227634-007	ES2227634-008	ES2227634-009	ES2227634-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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
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	%	**80.6**	**94.8**	**68.2**	**101**	**68.7**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**78.8**	**91.8**	**66.3**	**99.4**	**65.5**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	8791/11	8791/12	8791/Duplicate	----	----
			Sampling date / time	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2227634-011	ES2227634-012	ES2227634-013	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**12.2**	**19.7**	**22.2**	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**9**	<5	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	**36**	**26**	**23**	----	----
Copper	7440-50-8	5	mg/kg	**13**	**10**	**10**	----	----
Lead	7439-92-1	5	mg/kg	**18**	**12**	**11**	----	----
Nickel	7440-02-0	2	mg/kg	**10**	**7**	**7**	----	----
Zinc	7440-66-6	5	mg/kg	**1270**	**33**	**34**	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	8791/11	8791/12	8791/Duplicate	----	----
			Sampling date / time	03-Aug-2022 00:00	03-Aug-2022 00:00	03-Aug-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2227634-011	ES2227634-012	ES2227634-013	--------	--------
				Result	Result	Result	----	----
EP068A: Organochlorine Pesticides (OC) - Continued								
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<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	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	----	----	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	----	----	----
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	----	----	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	----	----	----
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	----	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**86.1**	**70.2**	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**80.9**	**65.8**	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	**8791/Rinsate**	**----**	**----**	**----**	**----**
			Sampling date / time	03-Aug-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2227634-014**	**--------**	**--------**	**--------**	**--------**
				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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2227634**	Page	: 1 of 8
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Contact	: Customer Services ES
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	: 93 Campbells Lane Coolamon - PSI	Date Samples Received	: 04-Aug-2022
Order number	: 8791	Date Analysis Commenced	: 06-Aug-2022
C-O-C number	: ----	Issue Date	: 09-Aug-2022
Sampler	: D. McMahon		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 14		
No. of samples analysed	: 14		

ilac-MRA NATA
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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4504311)									
ES2227556-014	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	21	23	7.0	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	15	13	9.4	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	9	13.5	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	68	63	8.2	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	40	31	25.5	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	139	135	2.9	0% - 20%
ES2227634-004	8791/4	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	29	25	15.9	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	8	8	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	8	8	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	10	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	17	18	5.9	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4504314)									
ES2227556-016	Anonymous	EA055: Moisture Content	----	0.1	%	37.5	40.8	8.3	0% - 20%
ES2227634-007	8791/7	EA055: Moisture Content	----	0.1	%	13.2	16.4	21.7	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4504312)									
ES2227556-014	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2227634-004	8791/4	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4501628)									
ES2227634-001	8791/1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4501628) - continued									
ES2227634-001	8791/1	EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES2227634-011	8791/11	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4501628)									
ES2227634-001	8791/1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES2227634-011	8791/11	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4503496)									
ES2227634-014	8791/Rinsate	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2227732-007	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4503523)									
ES2227283-010	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2227634-014	8791/Rinsate	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4504311)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	100	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	100	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	108	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	107	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	105	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	98.9	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	93.2	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4504312)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	92.5	70.0	125
EP068A: Organochlorine Pesticides (OC) (QCLot: 4501628)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	94.4	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.3	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.0	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.0	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	91.9	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	94.5	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	91.1	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.2	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.8	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.6	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.4	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.5	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.1	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	104	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	108	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	97.9	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	102	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	83.1	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4501628)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.8	62.0	128

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4501628) - continued								
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	83.1	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	88.0	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	95.3	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	92.8	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	92.0	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.9	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.5	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	99.1	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	89.8	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	91.8	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	94.0	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	83.7	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	91.8	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	96.3	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	104	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	60.5	41.0	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 4503496)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.8	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.1	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.3	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.7	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.3	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.9	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.5	79.0	117
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4503523)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	89.3	77.0	111

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4504311)							
ES2227556-014	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	89.5	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	88.3	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	88.7	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	90.2	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	86.7	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	85.1	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	83.8	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4504312)							
ES2227556-014	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	97.1	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 4501628)							
ES2227634-001	8791/1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	95.1	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	91.4	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	100	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	96.3	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	78.2	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	87.4	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4501628)							
ES2227634-001	8791/1	EP068: Diazinon	333-41-5	0.5 mg/kg	94.3	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	92.4	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	85.8	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	92.7	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	81.0	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4503496)							
ES2227635-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	94.2	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	93.5	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	93.7	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	93.3	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	92.8	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	95.0	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	94.6	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4503523)							
ES2227283-011	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	87.2	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2227634**	Page	: 1 of 5
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Telephone	: +61-2-8784 8555
Project	: 93 Campbells Lane Coolamon - PSI	Date Samples Received	: 04-Aug-2022
Site	: ----	Issue Date	: 09-Aug-2022
Sampler	: D. McMahon	No. of samples received	: 14
Order number	: 8791	No. of samples analysed	: 14

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

- **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)							
8791/1, 8791/2, 8791/3, 8791/4, 8791/5, 8791/6, 8791/7, 8791/8, 8791/9, 8791/10, 8791/11, 8791/12, 8791/Duplicate	**03-Aug-2022**	**----**	----	----	**07-Aug-2022**	17-Aug-2022	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
8791/1, 8791/2, 8791/3, 8791/4, 8791/5, 8791/6, 8791/7, 8791/8, 8791/9, 8791/10, 8791/11, 8791/12, 8791/Duplicate	**03-Aug-2022**	**07-Aug-2022**	30-Jan-2023	✓	**09-Aug-2022**	30-Jan-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
8791/1, 8791/2, 8791/3, 8791/4, 8791/5, 8791/6, 8791/7, 8791/8, 8791/9, 8791/10, 8791/11, 8791/12, 8791/Duplicate	**03-Aug-2022**	**07-Aug-2022**	31-Aug-2022	✓	**09-Aug-2022**	31-Aug-2022	✓

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
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
8791/1, 8791/2, 8791/3, 8791/4, 8791/5, 8791/6, 8791/7, 8791/8, 8791/9, 8791/10, 8791/11, 8791/12	**03-Aug-2022**	**06-Aug-2022**	17-Aug-2022	✓	**07-Aug-2022**	15-Sep-2022	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
8791/1, 8791/2, 8791/3, 8791/4, 8791/5, 8791/6, 8791/7, 8791/8, 8791/9, 8791/10, 8791/11, 8791/12	**03-Aug-2022**	**06-Aug-2022**	17-Aug-2022	✓	**07-Aug-2022**	15-Sep-2022	✓

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)							
8791/Rinsate	**03-Aug-2022**	**06-Aug-2022**	30-Jan-2023	✓	**06-Aug-2022**	30-Jan-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
8791/Rinsate	**03-Aug-2022**	**----**	----	----	**08-Aug-2022**	31-Aug-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	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	12	16.67	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	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Pesticides by GCMS	EP068	1	12	8.33	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Pesticides by GCMS	EP068	1	12	8.33	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Pesticides by GCMS	EP068	1	12	8.33	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	20	5.00	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	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	7	28.57	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	7	14.29	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	WATER	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	WATER	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 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. 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	WATER	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).

Preparation Methods	Method	Matrix	Method Descriptions
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)
Hot Block Digest for metals in soils sediments and sludges	EN69	WATER	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	WATER	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.