

**2028 CULCAIRN HOLBROOK ROAD AND
MORVEN-COOKARDINIA ROAD
MORVEN NSW 2660**

**PRELIMINARY SITE
INVESTIGATION**

**FOR THE
PROPOSED REZONING OF LAND**

MAY 2024

REPORT NO: 9990

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Report type

Preliminary Site Investigation
For the proposed rezoning of land

Site address

2028 Culcairn Holbrook Road and Morven-Cookardinia Road
Morven NSW 2660

Report number

9990

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1.0 Executive summary

DM McMahon Pty Ltd (McMahon) conducted this Preliminary Site Investigation (PSI) at the request of Ashley Mackey of Habitat Planning on behalf of Steven Pinnuck of Pinnuck Family Superannuation Fund for the proposed rezoning of land at 2028 Culcairn Holbrook Road and Morven-Cookardinia Road Morven NSW 2660. The rezoning includes amending the existing zoning of RU1 Primary Production and RU4 Primary Production Small Lots to R5 Large Lot Residential and amending the minimum lot size from 8ha to 2ha (Lots 136, 137 and 138 DP 753751) and from 100ha to 2ha (Lot 1 DP 240321).

The 24.1ha rezoning area (the site) is currently agricultural land, used for cropping and horse agistment. A map of the site investigated as part of this PSI and the current zoning map provided by Habitat Planning can be seen in **Attachment A**.

The issue of potential contamination is required to be considered whenever a 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 Habitat Planning, Steven Pinnuck, and the planning authority with a statement of site suitability for the proposed land use and recommendations for further investigation, assessment, and site management if required.

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.
- Undertake limited surface sampling for persistent agricultural chemicals in the paddocks and around the yards to assess the requirement for further investigation of these areas.
- Undertake limited surface sampling for fuel, oil, and pesticides around the sheds to assess the requirement for further investigation of these areas.
- From the information collected, develop a conceptual site model detailing the potential contamination source-pathway-receptor linkages.
- Provide a preliminary assessment of site contamination and contaminants of potential concern.
- Conduct a risk assessment for site suitability regarding potential contamination and the proposed development.
- Identify the data gaps in the assessment of site contamination.
- Provide recommendations for further investigation.

Findings of the investigation include:

- The desktop study found the site has a history of agricultural land use, with a house on site from at least 1959. This house was demolished by 1980 and the existing house was built sometime between 1998 and 2007. A horse arena, yards and a shed are to the west of the existing house with another horse arena and shed to the north of the house (built between 2019 and 2021). The eastern portion of the site is divided into

paddocks for horses with horse shelters in each paddock. The western half of the site is used for broadacre cropping.

- A site inspection complemented the desktop study and found the following sources of potential contamination that may materially affect the development:
 - Agricultural chemicals that may have been used across the paddocks and in the horse arenas and yards.
 - Asbestos containing material from the demolished house and in the rubbish pile.
 - Fuel and oil leaks and spills in the sheds.
 - Chemical storage in the sheds.
 - Septic system.
 - Bonfires.
 - Rubbish
 - Off-site sources including potential fuel storage to the south of the site.
- Soil sampling was conducted to assess contamination from agricultural chemicals across the paddocks, in the horse arenas and in the sheds, with samples from the sheds also assessed for contamination from fuel and oil leaks and spills. Samples from the sheds were analysed for heavy metals, organochlorine and organophosphate pesticides, hydrocarbons, and solvents.
- From the information collected, it is assessed that the potential contamination sources could pose a risk to future site users (through dermal contact, ingestion, or inhalation of potentially contaminated soils) but sampling returned chemical results that were below the criteria for residential land use.
- The risk assessment undertaken suggests that gross contamination from agricultural chemicals and from fuel and oil leaks and spills is not present at the site. Asbestos containing material was found in the location of the demolished house and in the rubbish pile on Lot 136. Further investigation is required in these areas.
- Data gaps exists around the suitability of the site for future development however the identified potential contamination sources do not preclude the proposed rezoning.
- Based on the findings of the PSI, further investigation and assessment is required as asbestos contamination is potentially present and the information available is insufficient to enable an appropriate level of risk assessment for future development. Investigations should identify the nature of the potential contamination and delineate its lateral and vertical extent to a sufficient degree that appropriate site management strategies can be devised, if required.

This executive summary and the findings of this PSI are subject to the recommendations in **Section 10.0** and limitations as stated in **Section 11.0**. 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.

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.
- Undertake a risk assessment for health risk to future site users and the environment.
- Provide a statement of site suitability or recommendations for further investigation.
- 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 (Resilience and Hazards) 2021.
 - 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 across the site 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.

4.0 Site identification

The site identification and details are as follows.

- Address: 2028 Culcairn Holbrook Road and Morven-Cookardinia Road Morven NSW 2660.
- Real property description:
 - Lot 136 DP 753751.
 - Lot 137 DP 753751.
 - Lot 138 DP 753751.
 - Lot 1 DP 240321.
- Development area centre co-ordinate: 511148E 6054514N MGA GDA z55.
- Property size: 24.4ha (total development area).
- Owner:
 - Lot 136 DP 753751– Morven Enterprises Pty Ltd.
 - Lot 137 DP 753751– Morven Enterprises Pty Ltd.
 - Lot 138 DP 753751 – Steven John Pinnuck.
 - Lot 1 DP 240321 – Steven John Pinnuck.
- Local Government Area: Greater Hume Shire Council.
- Current zoning: RU1 Primary Production and RU4 Primary Production Small Lots.
- Proposed zoning: R5 Large Lot Residential.
- Present use: Agricultural.
- Development Application reference: Not known.

5.0 Site history

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

Historical owners and occupiers

Lot 136 DP 753751

1947 owned by Thomas M. Shearer.

1978 owned by Victor Wilbur Shearer (brother of Thomas M. Shearer).

1978 Perpetual Lease Grant issued.

Other owners unknown.

Lot 137 DP 753751

1912 Suburban Holding Lease issued to Henry James Deakes.

1920 Suburban Holding Grant issued to Henry James Deakes.

1922 owned by James Malcolm Baldwin (labourer).

1930 owned by Selina Louisa Baldwin (widow).

1946 owned by Austin James Walter Baldwin (farmer).

1970 (July) owned by Kathleen Mary Verina Jones (married woman).

1970 (September) owned by Kingsley Tayler Shearer (apiarist)

1976 Perpetual Lease Grant issued.

Other owners unknown until it was purchased by Steven John Pinnuck in 2021 from Malcolm Sydney Shearer (son of Kingsley Tayler Shearer).

Lot 138 DP 753751

1947 owned by Reginald Shearer.

1978 owned by Kingsley Tayler Shearer (apiarist).

1978 Perpetual Lease Grant issued.

Other owners unknown until it was purchased by Steven John Pinnuck in 2021 from Malcolm Sydney Shearer (son of Kingsley Tayler Shearer).

Lot 1 DP 240321

1971 Grant upon Purchase of Unnecessary Road by Kingsley Tayler Shearer.

Other owners unknown until it was purchased by Steven John Pinnuck in 2021 from Malcolm Sydney Shearer (son of Kingsley Tayler Shearer).

Council records

A Section 10.7 Planning Certificate (Certificate No: 5854) was obtained from Council on 6 May 2024 and the certificate states the site has no matters prescribed within the meaning of the Contaminated Land Management Act 1997.

The following Council records were received on 7 May 2024:

Lot 137 DP 753751

- DA63/05 (2005) by applicant PJ & LE Bowen on behalf of owner MS Shearer for a new dwelling and garage.
- License for the approval to operate an on-site sewage management system. Ref CC: JW A:10063204. OSMS No. 1244 (2021) Morven Enterprises Pty Ltd – As a result of an inspection Council has classified your septic tanks and absorption trench system as low risk to the environment and public health, defined by Councils On-site Sewage Management Plan (OSMS). This licence to operate is valid until 29th September 2029 subject to the attached conditions.

EPA records

There are no records on the Contaminated Land Record Database for the site or adjacent properties 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 April 2024.

Internet search

- Government Gazette of the State of NSW (Sydney) May 1912 Issue 70. Notification Setting Apart Crown lands for Suburban Holdings. The areas will be available for Suburban Holdings on and after 10th June 1912. Portion comprised in Suburban Holding [...]: 136, 137. Character of Land, Soil Timber & Water Supply: Level, open, green box and gum forest, the soil being good clayey loam, well grassed; present grazing capacity, 3 acres to one sheep, fully improved grazing capacity, about ¾ acres to one sheep. Water- no permanent supply; good sites for tanks.
- Border Morning Mail (Albury) April 1942. Culcairn. To Live at Morven. The wedding of Jean [...] to Kingsley Taylor, youngest son of Mr T. Shearer of Morven and the late Mrs. Shearer, was celebrated at Orange. [...] Mr. Vic Shearer, of Bungowannah, brother of the bridegroom was the best man. [...] They will live at Morven.
- Government Gazette of the State of NSW (Sydney) September 1970 Issue 124. Notification of Proposed Closing of Roads. Kingsley Talyer Shearer, 4 acres 1 rood 36 perches. Road separating portions 136 and 138 from portion 11, Parish and Town Morven, County Hume. Rds 70-1163.
- greaterhume.nsw.gov.au/GHTownVill/Villages-of-Greater-Hume/Morven - Morven sits beside Billabong Creek. The creek provides a vegetated wildlife corridor and pleasant outlook from the historic Round Hill Hotel, dating back to the 1850's as a Cobb & Co Station (before the crossing of Billabong Creek). The decline of Cobb & Co came with the arrival of the railway line through Culcairn.
- domain.com.au – 2028 Culcairn Holbrook Road Morven. Sold 2005, 2006 and 2021.
- realstate.com.au – 2028 Culcairn Holbrook Road Morven has a land size of 72,841m². It is a house with 3 bedrooms, 1 bathroom and 2 parking spaces. It was sold in 2021.

Previous reports

Habitat Planning (2023) Scoping Report. Amendment to Greater Hume Local Environmental Plan 2012. 2028 Culcairn-Holbrook Road & Morven-Cookardinia Road, Morven. Ref: 23148.

- This Planning Proposal Scoping Report is submitted to Greater Hume Shire Council in support of a Planning Proposal to amend the Greater Hume Local Environmental Plan 2012 (LEP).
- Specifically, the Planning Proposal seeks to amend the zone and minimum lot size of the Greater Hume Local Environmental Plan 2012 in relation to land described as Lots 136, 137 and 138 in DP753751 and Lot 1 in DP 240321 and addressed as 2028 Culcairn-Holbrook Road, Morven and Morven-Cookardinia Road, Morven. The purpose of the amendment is to enable development of the land for a larger lot residential character, consistent with the urban fringe of Morven.
- The subject land is well placed to integrate with the core urban area of the Morven township and represents a transition from the higher density lots to rural land beyond.
- Proposed amendment:
 - Amend the Land Zoning Map of the Greater Hume Local Environmental Plan 2012 in relation Lots 136, 137 and 138 in DP753751 to change the zoning from RU4 Primary Production Small Lots to R5 Large Lot Residential.
 - Amend the Lot Size Map of the Greater Hume Local Environmental Plan 2012 in relation Lots 136, 137 and 138 in DP753751 to change the minimum lot area from 8 hectares to 2 hectares.
 - Amend the Land Zoning Map of the Greater Hume Local Environmental Plan 2012 in relation Lot 1 in DP 240321 to change the zoning from RU4 Primary Production Small Lots to R5 Large Lot Residential.
 - Amend the Lot Size Map of the Greater Hume Local Environmental Plan 2012 in relation Lot 1 in DP 240321 to change the minimum lot area from 100 hectares to 2 hectares.
- The subject land is a grouping of four (4) lots at the northern extent of the Morven township, described as Lot 136 in DP753751, Lot 137 in DP753751, Lot 138 in DP753751 and Lot 1 in DP240321. The land is bounded by Culcairn-Holbrook Road to the south and Morven-Cookardinia Road to the east. Privately owned properties adjoin the west and northern boundaries of the site, comprise RU4 zoned and RU1 zoned land respectively.
- Morven was founded as a coach stop, though it was gradually overtaken as a strategic transport stop by the town of Culcairn and the north-south railway line. Now it is better categorised as a commuter suburb, being accessible from Culcairn and within commuting distance of Albury-Wodonga.
- There is demand for larger lot residential properties within Morven, given its close proximity to Culcairn and ease of access to major transport corridors to larger regional centres.
- It is considered that Morven provides an 'rural living' extension to the Culcairn village area, in that it offers lifestyle opportunities in close proximity to a main village area.
- Culcairn has a lack of housing diversity, particularly a lack of larger lifestyle lots, which can be catered for in Morven. It is considered that Morven is well positioned to serve the role of providing lifestyle lots for the Culcairn village context.
- The next higher order towns are Holbrook (20km east), Albury (56km south) and Wagga Wagga (73km north). It is considered that the Morven would appeal to persons

seeking a reasonable commuting distance of regional centres where land and housing would be more diverse and relatively affordable.

- There is an opportunity for the land to be utilised in a form that is expected to better represent the long-term requirements for the Morven township.
- The subject land is located within an area surrounded by large lot village areas and rural residential properties. The village area is serviced by sealed roads and reticulated services, but largely contain a high proportion of on-site sewer services and wastewater disposal. The subject land can be serviced by some of these existing services, subject to upgrade and extension, however, will rely on provision of new on-site services.
- Electricity services are provided to the village area by Essential Energy and connected to all residential and rural properties in the village and peripheral areas. Further consultation will be undertaken with Essential Energy to confirm servicing capabilities of the network.
- The subject land is not known to be contaminated based on preliminary understanding of the land and details provided by the landowners. There are no structures or storage areas considered likely to be potentially contaminating. A more detailed assessment of the requirements of State Environmental Planning Policy (Resilience and Hazards) 2021 will be undertaken in the Planning Proposal to satisfy the provisions of an LEP amendment and subsequent development application.
- The subject land is not identified as being subject to bushfire or flooding as per the relevant maps and studies carried out by Greater Hume Shire.
- The proposal is not expected to result in any disturbance of habitat areas or natural features of the area because it relates to the rezoning of a land that is largely devoid of any significant habitat. Further, the larger area of the lots being proposed means that areas of sensitivity (if identified) can be contained within future lots.

The land to be rezoned has been subject to ongoing agricultural activity for a significant period of time and has been heavily modified from its original state. There are no mapped areas of environmental land, there are no significant areas of native vegetation within the land and there are no areas of watercourses or other potentially sensitive landscapes. An area of biodiversity values is noted further south along the Billabong Creek, however, is well removed from the site.

Aerial photographs and satellite images

McMahon observed the following from a review of the available aerial photography and satellite imagery.

Aerial photographs and satellite images

McMahon observed the following from a review of the available aerial photography.

1959 – The original house can be seen on Lot 137. Access is via Culcairn Holbrook Road. A small circular dam can be seen in the south east corner of the site. Scattered paddock trees can be seen across the site. Surrounding land use is agricultural with some residential houses and community tennis courts built to the south across Culcairn Holbrook Road.

1966 – A small shed can be seen to the west of the house.

1972 – No change to the site from 1966. The Morven general store has been built to the east of the tennis courts (south of the site).

1980 – The house and shed have been demolished. The site has been divided into north and south paddocks by a fence running east-west. Some of the paddock trees have been removed.

1991 – A small stockpile can be seen to the west of the location of the demolished house. The dam in the south east corner has been enlarged into a rectangular shape. Further residential development has occurred to the south of the site, across Culcairn Holbrook Road.

1998 – No change to the site from 1991.

2007 – A house and shed have been built around the approximate location of the demolished house. Some fill has been placed in front of the site, assumed to be gravel for a parking area. Yards can be seen to the north of the house. The site has been divided into four paddocks with the original north-south paddocks now divided by a fencing running north-south.

2010 – The paddock of Lot 137 appears to be worked with the rest of the site appearing undeveloped.

2013 – The paddock of Lot 137 has been divided into approximately five fenced areas. Animals can be seen across Lot 137 although it is not clear what animals they are. Multiple cars can be seen around the house and shed. The image is not clear but scattered items can be seen around the house and shed.

2014 – Most of the scattered items has been removed.

2015 – The image is clearer, and it appears like the scattered items are for horning events. Horse floats can be seen around the house and horses can be seen in the paddocks of Lot 137. A round arena has been built to the north west of the house. Horse shelters can be seen to the west and south of the house. Another horse shelter can be seen to the north of the shed.

2016 – No change to the site from 2015.

2017 – Horse shelters have been built in two of the fenced areas of Lot 137. The northern half of Lot 138 has been fenced into five areas, with horse shelters built in four of the areas. A square pad has been outlined in the north of Lot 138. A track runs through Lot 138 from the access gates in the north east and south east corners of the lot. Two trees have been felled, one on Lot 136 and one of Lot 138 to the east of the square pad.

2018 – No change to the site from 2017.

2019 – A round arena has been built on the square pad on Lot 138. Horses can be seen across the whole site.

2020 – No change to the site from 2019.

2021 – The driveway to the house and shed on Lot 137 has been gravelled. The fenced areas in the paddock of Lot 137 have been removed. The fence dividing Lot 136 and 137 has also been removed and the paddocks have been worked as one large paddock. Hay bales can be seen along the southern boundary in the south west corner of Lot 137. A shed has been built to the east of the round yard on Lot 138.

2022 – The yards have been removed to the north of the house. Hay bales can be seen across Lot 136 and Lot 137 and can also be seen stacked to the north of the horse arena on Lot 138.

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 located in the north of the village of Morven at the corner of Culcairn Holbrook Road and Morven-Cookardinia Road. The town of Culcairn lies approximately 7km to the west of Morven.
- Surrounding land use is agricultural to the north, east, and west. Residential lies to the south, across Culcairn Holbrook Road. The former Morven general store is to the south of the site, opposite the entrance from Culcairn Holbrook Road.
- The site is made up of 4 lots – Lot 136 and Lot 137 form the western half of the site. Lot 136 is undeveloped. Lot 137 includes a house, slab on grade shed, horse arena and horse/cattle yards. The paddocks have been cultivated for oats. Lot 138 forms the eastern half of the site and has been divided into paddocks for horses with horse shelters in each paddock. Improvements include a shed, and horse arena. A dam and two wells lie in the south east of the lot. Lot 1 is a strip of land along the northern boundary of the site which was formerly a road reserve. The land was incorporated into the site in 1971.
- A small rubbish pile exists in centre of the southern boundary of Lot 136. The pile consists of soil, cinder bricks, concrete, timber, lead flashing, an old oven, and asbestos pipes. The pipes are in good condition and no asbestos fragments were observed, however thick grass hampered a thorough visual inspection of the area.
- The entrance to Lot 137 is via a gravelled driveway from Culcairn Holbrook Road. The gravelled driveway leads to the house and veers left towards the shed, north of the house. A small stockpile of remaining gravel was seen to the south west of the house. The gravel was visually assessed to be commercially available quarried material.
- The house is a slab on grade tin building with a small firepit in the front yard. The house is serviced by a septic system, with the tank and pump to the north of the house and the disposal area to the north east. A standpipe was visible in the disposal area.
- To the north east of the house is remnants of the demolished house, as identified in the aerial photographs. Small pieces of glass were observed along with ten pieces of asbestos containing material (ACM). There is likely to be more however thick grass hampered a thorough visual inspection of the area.
- To the north of the house lies a slab on grade shed. The shed is in tidy condition with no chemical or fuel storage observed. No staining was observed on the concrete surface.
- To the west of the shed is a small concrete slab and the remnants of a small bonfire consisting of building materials. Nails were observed in the ash. No ACM was observed. In this area, an old well has been covered with a steel plate which has been bolted to concrete. It is assumed the well was hand dug as the top was brick lined.
- Further west of the concrete slab and bonfire remnants is a round horse arena and horse/cattle yards. Some rubbish was observed around the arena and yards, consisting off wooden pallets, tin, concrete, pine logs and old bathtubs. A site won soil loading ramp is to the south of the yards.
- There are two entrances to Lot 138 – one in the north east corner of the site, off Morven-Cookardinia Road and one in the south east corner of the site, opposite Coach Road (Brownrigg Street). Both entrances have been gravelled with the same commercially available quarried material as the entrance at Lot 137.

- In the north of Lot 138 stands a shed and horse arena. The shed is of tin construction with a dirt floor. An old Massey tractor with a mower attachment stands in the shed. No oil or fuel staining is visible around the tractor. A small diesel fuel tank is stored on a wooden pallet nearby. Some minor fuel spills have occurred. Agricultural chemicals have been stored in the shed including oil, herbicides, and insecticides. A small homemade spray rig is also stored in the shed but looks infrequently used. A small area has been used for filling chemicals and spills and leaks may have occurred.
- A small laydown area lies to the west of the shed consisting of old bathtubs, wire, steel fencing panels, tyres, a tractor bucket attachment, and a soil stockpile. The laydown area is assumed to be used to store items for horse eventing. A shipping container can also be seen in this area.
- A round horse arena lies further west of the laydown area. The arena is covered with sand, overlying road base which is underlain by clay soil. A rubbish pile lies outside the arena consisting of old mattresses, a bulk plastic container, a felled tree, wooden pallets, a gravel stockpile (assumed to be from the driveways) and tyres. Round hay bales covered in plastic and weighted down with tyres can be seen to the north of the rubbish pile.
- Two old wells exist to the south of the shed and horse arena, in the approximate centre of Lot 138. One has been covered with a steel plate which has been bolted to concrete. The other well has been covered with timber sleepers and has been fenced off with wire fencing. The wells are assumed to be hand dug and their depths are unknown.
- An unlined dam is in the south east of Lot 138, near the entrance gate from Coach Road. The dam appears to be filled by runoff from the surrounding agricultural land and from Morven-Cookardinia Road. No slicks or sheens were observed on the surface of the water and yabbies were seen at the water's edge.

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 lies on extensive level alluvial plains of Billabong Creek at an elevation range of approximately 225m to 230m AHD.

Vegetation

The site is covered with broadleaf weeds and annual and perennial grasses. Sedge grass was observed in the Lot 137. Lot 137 has been worked ready for oats and Lot 138 has been left fallow for horse adjustment. The driveway to the house and shed is gravelled with commercially available quarried material.

Natural Resources Sensitivity

A search of the Greater Hume Local Environment Plan (2012) found the site is not mapped as being in a natural resource sensitivity area for riparian lands and watercourses, or terrestrial biodiversity. No other maps were available.

Weather

The average rainfall for Morven is around 650mm per annum, with the wettest months being June, July, and August. Morven is characterised by cold wet winters and hot dry summers.

Hydrology

The nearest named waterway is Billabong Creek located around 1.2km to the south of the site. Billabong Creek flows west towards the Edward River. Flood studies have not been undertaken for Morven.

Soil

Soils are typically brown to grey silty loam topsoils overlying a bleached silty loam to silty clay loam which is underlain by brown alluvial clay. Hardpans may occur under the bleached silty soil. Soils encountered on Lot 137 were poorly drained in the low-lying areas. Ferromanganiferous accretions and bleached soil were observed around sample location 6.

Geology

The local geology is unconsolidated riverine deposits of clay, silt, sand, and gravel.

Hydrogeology

There are no registered groundwater bores on site however nearby groundwater bores suggest groundwater is >10m below ground level. Aquifers are unconfined to semi-confined, with groundwater flow occurring primarily through unconsolidated alluvial sediments. Hydraulic conductivity is high, and transmissivity is moderate to high. Groundwater recharge rates are estimated to be high. Groundwater systems are typically intermediate to regional with intermediate to long flow lengths and are loosely defined by topographic catchments. Water quality within these systems is brackish to saline. Groundwater depths are intermediate to deep. Localised perching occurs above clay lenses during wetter periods.

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 DQOs 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 gross contamination from agricultural 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 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 second quarter of the year 2024.

DQO 5 - The analytical approach

Samples will be tested for heavy metals, organochlorine and organophosphate pesticides, hydrocarbons and solvents which may be persistent in the soil from the sites 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 data quality indicators, 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	Health Investigation Levels (HILs)
Pesticides	-Residential A NEPM (2013)	
Hydrocarbons	-Table 1A(1) Heavy metals and pesticides	
Solvents	-Soils within 3m of surface	
		Health Screening Levels (HSLs)
		-Residential A NEPM (2013) and CRC Care (2011)
		-Table B4 Hydrocarbons and solvents (direct contact)
		-Clay soils within 2m of the surface
		Added Contaminants Limits (ACLs)
		-Residential A NEPM (2013)
		-Table 1B(1-4) Heavy metals
		-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, DDT, and naphthalene
		-Soils within 2m of surface
		Ecological Screening Levels (ESLs)
		-Residential A NEPM (2013)
		-Table 1B(6) Hydrocarbons, solvents, and benzo(a)pyrene
		-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, statistical analysis, management, or remediation will be undertaken or 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 systematic and 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:

- Six systematic soil sample locations taken across the paddocks and in the horse arenas. Samples analysed for heavy metals and pesticides (organochlorines and organophosphates).
- Two judgemental soil sample locations taken in and around the sheds. Samples analysed for heavy metals, pesticides (organochlorines and organophosphates), hydrocarbons and solvents.
- One soil duplicate sample.
- One soil rinsate sample.

By reference to the DQOs, a sampling map can be seen in **Attachment E**.

Sampling design justification

- Samples 1, 2, 6 and 7: to assess the near surface soil contamination from potential persistent agricultural chemicals diffuse application in the paddocks across the site.
- Sample 3: to assess the near surface soil contamination from potential persistent agricultural chemicals from application in the horse arena on Lot 138.
- Sample 4: to assess the near surface soil contamination from potential persistent agricultural chemicals around the filling area in the shed on Lot 138.
- Sample 5: to assess the near surface soil contamination from potential persistent agricultural chemicals and from fuel and oil leaks and spills in the shed on Lot 138.
- Sample 8: to assess the near surface soil contamination from potential persistent agricultural chemicals from application in the horse arena on Lot 137.
- Sample 9: to assess the near surface soil contamination from potential persistent agricultural chemicals around the shed on Lot 137.
- Sample 10: to assess the near surface soil contamination from potential persistent agricultural chemicals and from fuel and oil leaks and spills in the shed on Lot 137.

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 (Withdrawn).

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

Although these guidelines have recently been withdrawn, they have been used in the absence of other relevant Australian publications.

8.0 Results

The site inspection and sampling for this PSI was conducted over one day on 30 April 2024. The weather was mostly sunny with cool winds. A summary of the field observations and sample analytical results are as follows.

Soil and site surface

- Soils are brown to grey silty loam topsoils brown to grey silty loam topsoils overlying a pale silty loam to silty clay loam A2 horizon which is underlain by brown alluvial clay. Soils in the low-lying area around sample location 6 showed ferromanganiferous excretions and bleached soil.
- There were no visual or olfactory indicators of gross chemical contamination on site.

Soil analysis

- Heavy metals are below the Limits of Reporting (LORs) and/or the adopted criteria.
- Pesticides are below LORs and the adopted criteria.
- Hydrocarbons are below LORs and/or the adopted criteria.
- Solvents are below LORs and the adopted criteria.

Quality control and quality assurance results

- The duplicate sample (10) returned relative percent differences of <30% for all analytes except for arsenic (52%). This is considered to be of low significance as the results are well below the adopted criteria for sample location 10 and the duplicate.
- The rinsate sample returned results below the laboratory limit of reporting.
- There are no laboratory outliers.
- Based on the above, the laboratory quality control and quality assurance is of a suitable quality to rely on the results.

Tabulated results can be seen in **Attachment F**.

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

9.0 Conceptual site model

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

Summary

The site has been used for agriculture as far as records can ascertain. Chemicals associated with agricultural pesticide use from diffuse application across the site may have accumulated in the soil. Potential sources of contamination on Lot 137 include asbestos containing material (ACM) from the demolished house; agricultural chemicals used in the shed and horse arena; remnants from the small bonfire and fire pit; the septic system; and contamination from the rubbish pile. A rubbish pile also exists on Lot 136 and contains asbestos pipes. Potential sources of contamination on Lot 138 include chemicals associated with fuel and oil leaks and spills from machinery maintenance and storage in the shed; agricultural chemical storage and leaks and spills in the shed; agricultural chemicals used in the horse arena; the laydown area; and the rubbish pile. Offsite sources of contamination include potential fuel storage at the old general store to the south of the site, across Culcairn Holbrook Road. Pathways are primarily from soil disturbance and the potential release of asbestos fibres 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

- Agricultural chemicals that may have been used across the paddocks and in the horse arenas and yards.
- Asbestos containing material from the demolished house and in the rubbish pile.
- Fuel and oil leaks and spills in the sheds.
- Chemical storage in the sheds.
- Septic system.
- Bonfires.
- Rubbish.
- Off-site sources including potential fuel storage to the south of the site.

List of chemicals of potential concern

From the potential contamination sources, the Chemicals of Potential Concern (COPCs) most likely to impact the site are as follows:

- Pesticides.
- Heavy metals.
- Hydrocarbons.
- Polycyclic aromatic hydrocarbons.
- Solvents.
- Asbestos.

Mechanism of contamination

The mechanism of contamination is predominantly top-down vertical and lateral migration into soil. The mechanism of asbestos contamination is from the release of fibres from asbestos containing material during disturbance.

Potentially affected environmental media

- Soil.
- Air.
- Surface water.
- Groundwater.

Consideration of spatial and temporal variations

Spatial and temporal variation of persistent pesticides and heavy metals in the soil is likely. Temporal variation of asbestos is unlikely unless the asbestos is disturbed, and fibres are released.

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, fibres, vapour, and dust.
- Direct surface water contact.
- Groundwater ingestion.

Human and ecological receptors

- Future on-site users.
- Construction workers.
- Domestic groundwater users.
- 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

- There is low risk of pesticide and heavy metal contamination as the sampling returned low results.
- There is a risk of inhalation of asbestos fibres and contact with potentially contaminated soil from ACM around the location of the demolished house and from the asbestos pipes in the rubbish pile on Lot 136. It is possible that more asbestos pipes are underground, and care should be taken during development.

- There is low risk of gross contamination from fuel and oil leaks and spills as these are considered to be surficial and localised. The sampling returned results below the adopted criteria.
- There is low risk of contamination from the bonfire and fire pit areas as they are small and considered surficial and localised.
- There is low risk of contamination from the rubbish pile on Lots 137 and 138 and from the laydown area on Lot 138. These are an aesthetic issue which can be managed during development.
- There is low risk of contamination from the septic system as it was assessed by Council in 2021 to be low risk to the environment and public health. The system is regulated by Council and presents low health and environmental risk when regularly inspected and serviced. Any problems that arise with the existing septic system will require remediation.
- There is low risk of contamination from surface water. No slicks or sheens were observed on the dam in the south east of the site.
- There is low risk of contamination from the groundwater as exposure pathways are limited. Groundwater is likely to be at deep depths and domestic groundwater bores do not exist in the area. The site is connected to town water making groundwater ingestion unlikely. The three wells on site are generally inaccessible and are recommended to be decommissioned during development.
- There is a risk of contamination from the old general store to the south of the site if underground fuel storage exists. More information is required to assess the risk of contamination from this source.

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 relies heavily on the information provided by this PSI and is supplemented by data collected during sampling.

10.0 Conclusions and recommendations

This investigation 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 development.

Based on the findings of the PSI, it is concluded that contamination is potentially present and the information available is insufficient to enable an appropriate level of site-specific risk assessment for future development. As such further investigation and assessment is required.

The following is recommended:

- Targeted localised assessment for potential asbestos in soil is recommended to be conducted around the location of the demolished house. The asbestos pipes in the rubbish pile on Lot 136 are to be removed in line with standard industry practice with clearance issued by an appropriately trained and experienced person who is independent of the removal work. It is possible that more asbestos pipes are underground, and care should be taken during development.
- The bonfire remnants, the laydown area, and the rubbish piles on Lot 137 and 138 are an aesthetic issue and the soil in these areas is recommended to be excavated and disposed of at an appropriately licenced landfill.
- Further information is required to assess the risk of contamination from potential underground fuel tanks at the old general store.
- Data gaps exists around the suitability of the site for future development however the identified potential contamination sources do not preclude the proposed rezoning.
- In conclusion based on the findings of this report, a Detailed Site Investigation (DSI) is required as soil contamination is potentially present and the information available is insufficient to enable an appropriate level of risk assessment for future development. The DSI should identify the nature of the potential contamination and delineate its lateral and vertical extent to a sufficient degree that appropriate site management strategies can be devised, if required.

Although no filled gullies and dams were identified as part of this PSI, it is not uncommon to find these on agricultural land. Care must be taken to identify and evaluate unexpected finds such as these during development under the unexpected finds protocol in **Section 12.0**.

This executive summary and the findings of this PSI are subject to the limitations as stated in **Section 11.0**.

11.0 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 Habitat Planning, Steven Pinnuck and Pinnuck Family Superannuation Fund 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.

12.0 Unexpected findings

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

13.0 Notice of Copyright

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14.0 Attachments

A. Site maps and current zoning map	3 pages
B. Aerial photographs and satellite imagery	18 pages
C. Site features	3 pages
D. Site photographs	17 pages
E. Sampling map	1 page
F. Tabulated results	1 page
G. Laboratory reports	15 pages



Attachment A : *Site map and current zoning map*

2028 Culcairn Holbrook Road and Morven-Cookardinia Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2022

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2022

Legend
Boundary



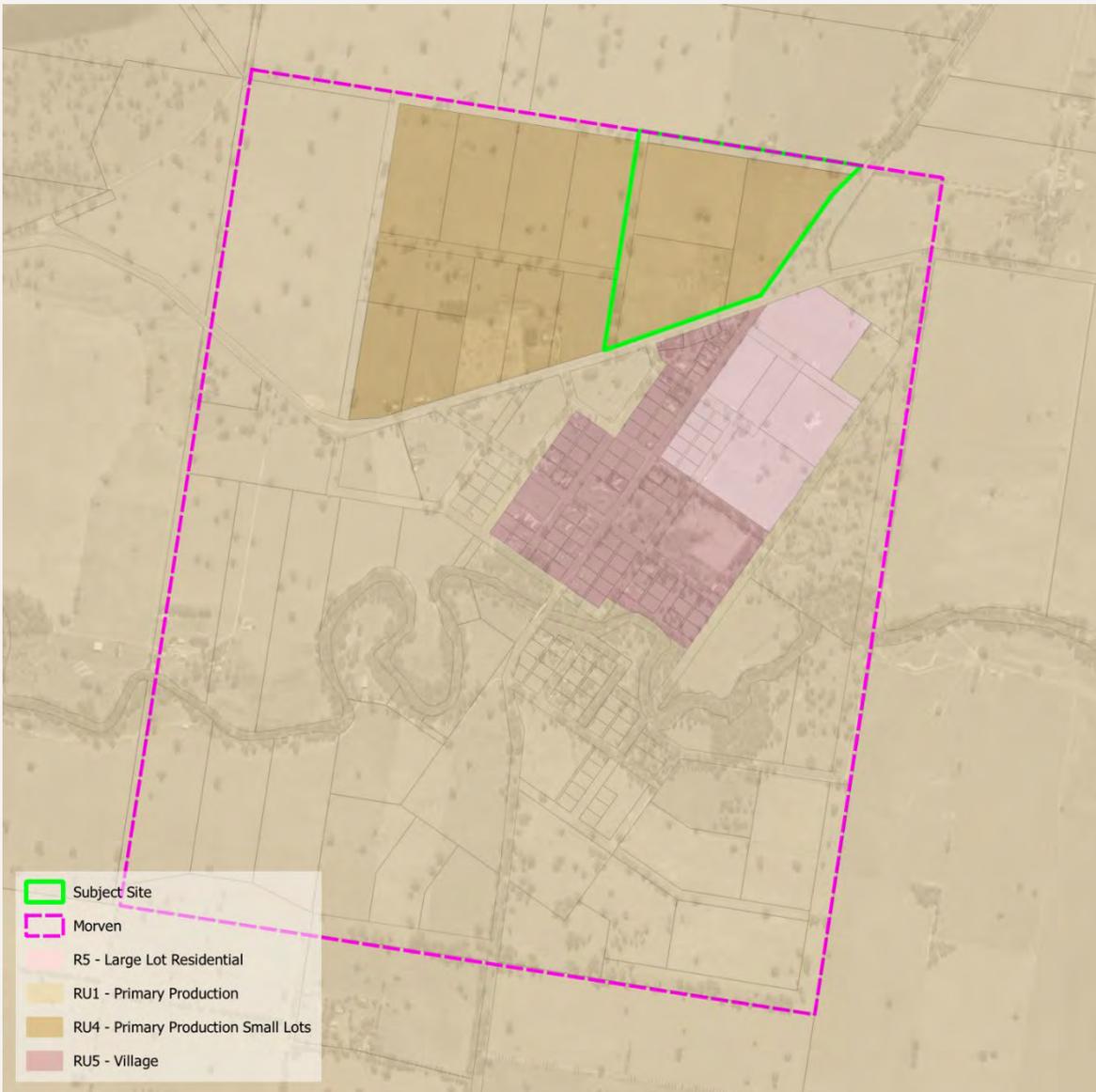


Figure 4 - Subject Site and Morven



Attachment B : *Aerial photographs and satellite images*

2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
NSW Spatial Services image 1959

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
NSW Spatial Services image 1966

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
NSW Spatial Services image 1972

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
NSW Spatial Services image 1980

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
NSW Spatial Services image 1991

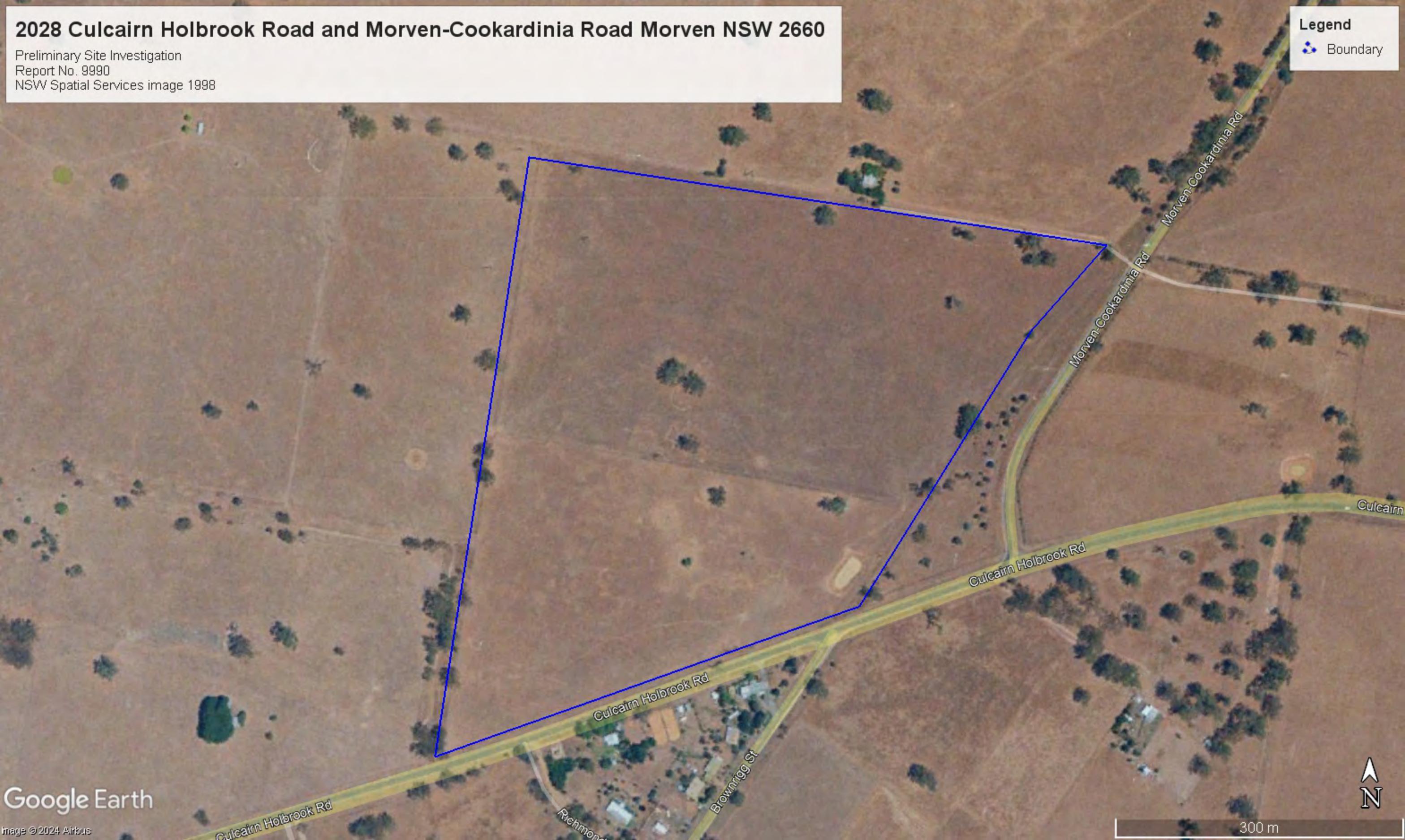
Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
NSW Spatial Services image 1998

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2007

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2010

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2013

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2014

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2015

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2016

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2017

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2018

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2019

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2020

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2021

Legend
Boundary



2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2022

Legend
Boundary





Attachment C : *Site features*

2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2022

Legend

- Boundary
- Demolished house (approx.)
- Existing house
- Horse arena
- Horse yard
- Septic disposal area (approx.)
- Shed



2028 Culcairn Holbrook Road and Morven-Cookardinia Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2022

Legend

- Boundary
- Demolished house (approx.)
- Existing house
- Horse arena
- Horse yard
- Septic disposal area (approx.)
- Shed



Rubbish pile

Well

Well

Bonfire

Small concrete slab

Septic tank and pump

Gravel fill

Small firepit



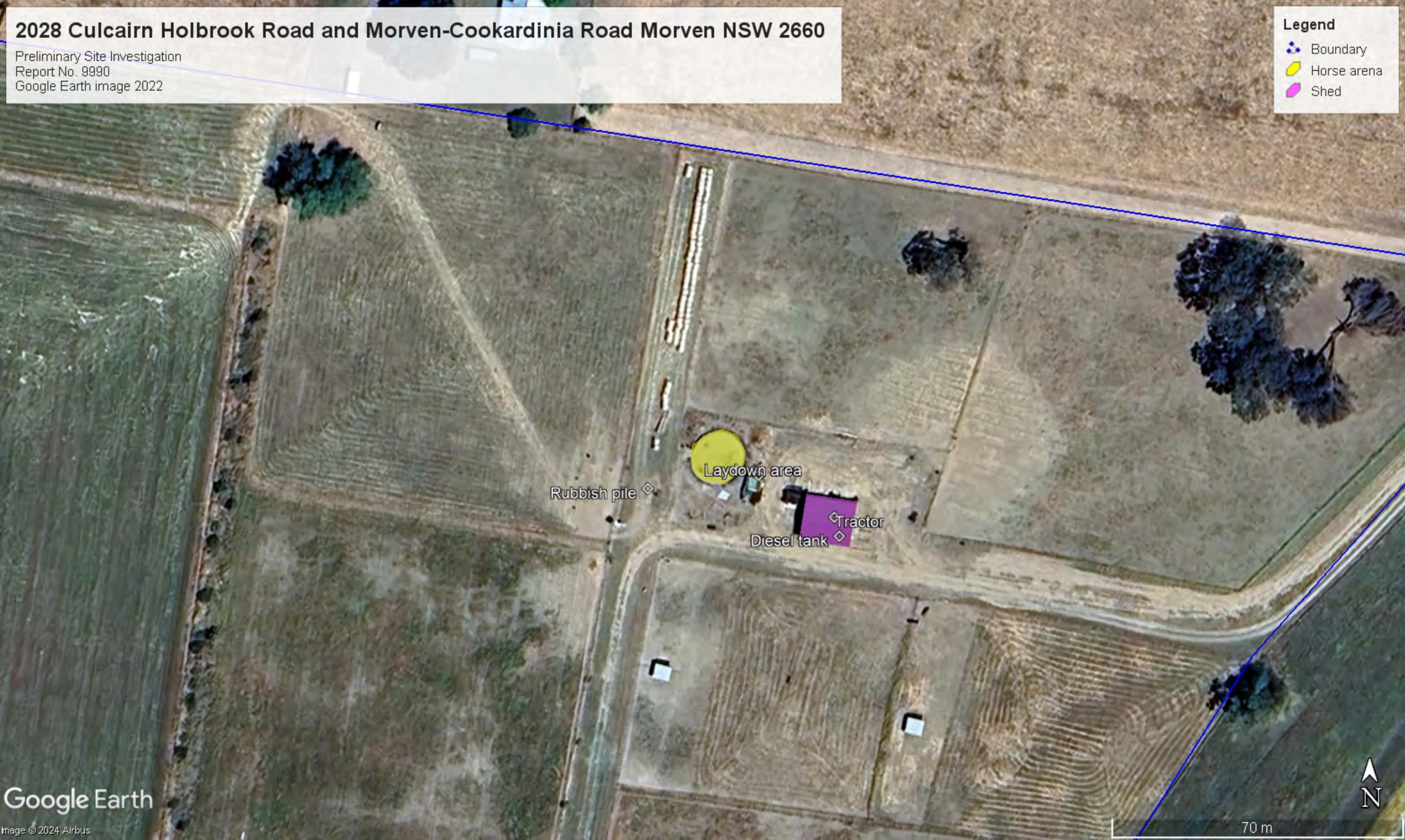
80 m

2028 Culcairn Holbrook Road and Morven-Cookardinia Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2022

Legend

- Boundary
- Horse arena
- Shed



Laydown area

Rubbish pile

Tractor
Diesel tank



70 m



Attachment D : *Site photographs*



Photograph 1: The site. Photograph taken facing north east from Lot 137.



Photograph 2: The site. Photograph taken facing south from Lot 137.



Photograph 3: The old Morven general store to the south of the site. Photograph taken facing south.



Photograph 4: Rubbish pile at Lot 136. Photograph taken facing west.



Photograph 5: The entrance to Lot 137. Photograph taken facing north from Culcairn Holbrook Road.



Photograph 6: Stockpile of remaining gravel south west of the house. Photograph taken facing east.



Photograph 7: Septic tank and pump to the north of the house. Photograph taken facing south west.



Photograph 8: Septic disposal area to the north east of the house. Photograph taken facing north.



Photograph 9: Pieces of glass at the location of the demolished house.



Photograph 10: Asbestos fragment at the location of the demolished house.



Photograph 11: Asbestos fragment at the location of the demolished house.



Photograph 12: Slab on grade shed to the north of the house. Photograph taken facing north west.



Photograph 13: Inside the slab on grade shed. Photograph taken facing north west.



Photograph 14: Small concrete slab to the west of the shed. Photograph taken facing south east.



Photograph 15: Remnants of the small bonfire to the west of the shed. Photograph taken facing east.



Photograph 16: The old well to the west of the shed. Photograph taken facing east.



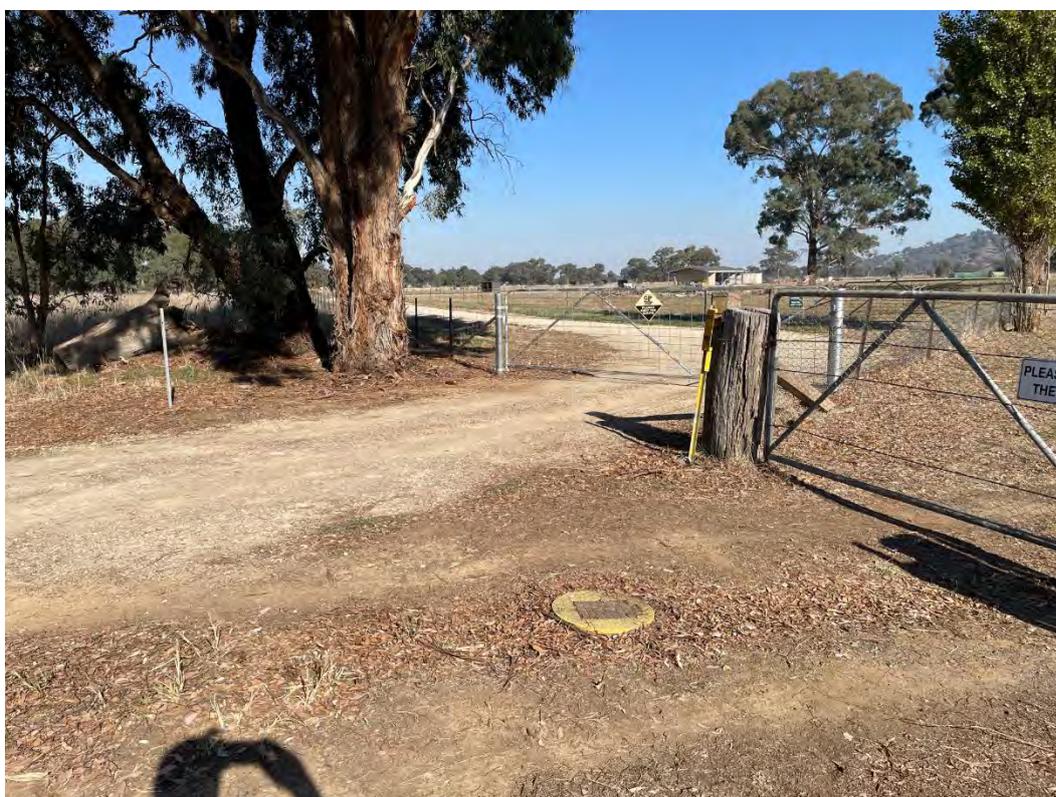
Photograph 17: Horse/cattle yards further west of the shed. Photograph taken facing north west.



Photograph 18: Rubbish around the yards. Photograph taken facing west.



Photograph 19: The loading ramp to the south of the yards. Photograph taken facing west.



Photograph 20: The entrance to Lot 138. Photograph taken facing south west from Morven-Cookardinia Road.



Photograph 21: The shed on Lot 138. Photograph taken facing south.



Photograph 22: Small diesel fuel tank inside the shed. Photograph taken facing south.



Photograph 23: Chemical storage and filling area inside the shed. Photograph taken facing east.



Photograph 24: Chemical storage inside the shed. Photograph taken facing west.



Photograph 25: Oil storage inside the shed. Photograph taken facing south.



Photograph 26: Laydown area to the west of the shed. Photograph taken facing west.



Photograph 27: The round horse arena west of the laydown area. Photograph taken facing north.



Photograph 28: Rubbish pile outside the arena. Photograph taken facing south west.



Photograph 29: Gravel stockpile outside the arena. Photograph taken facing north.



Photograph 30: Hay bales. Photograph taken facing south.



Photograph 31: horse paddocks on Lot 138. Photograph taken facing north.



Photograph 32: Two old wells. Photograph taken facing south west.



Photograph 33: The dam in the south east corner of the site. Photograph taken facing north from the entrance from Coach Road (Brownrigg Street).



Attachment E : *Sampling map*

2028 Culcairn Holbrook Road and Morven-Cookardina Road Morven NSW 2660

Preliminary Site Investigation
Report No. 9990
Google Earth image 2022

Legend

- Boundary
- Sampling locations





Attachment F : *Tabulated results*

Page: 1 of 1
 Job number: 9990
 Project: 2028 Culcairn Holbrook Road and Morven-Cookardinia Road Morven NSW

Compound	LOR	Unit	Sample date										Residential A Criteria						
			30/4/24	30/4/24	30/4/24	30/4/24	30/4/24	30/4/24	30/4/24	30/4/24	30/4/24	30/4/24	-	-	HILs	HSLs	ACLs	EILs	ESLs
			Sample location	Paddock	Paddock	Arena	Shed	Shed	Paddock	Yard	Arena	Shed	Shed	-					
Sample ID	1	2	3	4	5	6	7	8	9	10	-	-							
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	-	-						
Arsenic	5	mg/kg	12	7	10	11	88	14	8	10	12	12	-	-	100	-	-	100	-
Cadmium	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	20	-	-	-	-
Chromium	2	mg/kg	17	14	18	23	13	21	17	18	18	16	-	-	-	-	400	-	-
Copper	5	mg/kg	10	7	11	13	14	13	12	16	24	14	-	-	6000	-	-	190	-
Lead	5	mg/kg	16	13	15	16	16	17	14	19	41	34	-	-	300	-	-	1100	-
Nickel	2	mg/kg	7	5	9	10	11	8	7	8	7	6	-	-	400	-	-	170	-
Zinc	5	mg/kg	17	14	24	32	39	23	35	86	387	121	-	-	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	-	-	40	-	-	-	-
PCBs	0.1	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
HCB	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<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	-	-	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	-	-	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	-	-	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	-	-	270	-	-	-	-
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	-	-	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	-	-	240	-	-	-	-
Chlorpyrifos	0.05	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	160	-	-	-	-
Phenols	0.5	mg/kg	-	-	-	-	<0.5	-	-	-	-	<0.5	-	-	3000	-	-	-	-
PAHs	0.5	mg/kg	-	-	-	-	<0.5	-	-	-	-	1.1	-	-	300	-	-	-	-
Benzo(a)pyrene	0.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7
Benzo(a)pyrene TEQ (half LOR)	0.5	mg/kg	-	-	-	-	0.6	-	-	-	-	0.6	-	-	-	-	-	-	-
TRH C6-C10 minux BTEX (F1)	10	mg/kg	-	-	-	-	<10	-	-	-	-	<10	-	-	-	50/4400	-	-	180
TRH C10-C16 minus naphthalene (F2)	50	mg/kg	-	-	-	-	<50	-	-	-	-	<50	-	-	-	280/3300	-	-	120
TRH C16-C34 (F3)	100	mg/kg	-	-	-	-	170	-	-	-	-	<100	-	-	-	-/4500	-	-	1300
TRH C34-C40 (F4)	100	mg/kg	-	-	-	-	<100	-	-	-	-	<100	-	-	-	-/6300	-	-	5600
Benzene	0.2	mg/kg	-	-	-	-	<0.2	-	-	-	-	<0.2	-	-	-	0.7	-	-	65
Toluene	0.5	mg/kg	-	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	480	-	-	105
Ethylbenzene	0.5	mg/kg	-	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	-	-	-	125
Xylenes	0.5	mg/kg	-	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	110	-	-	45
Napthalene	1	mg/kg	-	-	-	-	<1	-	-	-	-	<1	-	-	-	5	-	170	-



Attachment G : *Laboratory reports*



CERTIFICATE OF ANALYSIS

Work Order : **ES2414136**
Client : **DM MCMAHON PTY LTD**
Contact : ADMIN
Address : 6 JONES ST
Wagga Wagga NSW, AUSTRALIA 2650
Telephone : +61 02 6931 0510
Project : Morven
Order number : 9990
C-O-C number : ----
Sampler : DAVID MCMAHON
Site : ----
Quote number : EN/111
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 14
Laboratory : Environmental Division Sydney
Contact : Danae Hambly
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 01-May-2024 10:25
Date Analysis Commenced : 03-May-2024
Issue Date : 08-May-2024 18:14



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 Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

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

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

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

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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	6
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-001	ES2414136-002	ES2414136-003	ES2414136-004	ES2414136-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		20.6	11.6	12.9	13.4	17.0
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		12	7	10	11	14
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		17	14	18	23	21
Copper	7440-50-8	5	mg/kg		10	7	11	13	13
Lead	7439-92-1	5	mg/kg		16	13	15	16	17
Nickel	7440-02-0	2	mg/kg		7	5	9	10	8
Zinc	7440-66-6	5	mg/kg		17	14	24	32	23
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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	6
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-001	ES2414136-002	ES2414136-003	ES2414136-004	ES2414136-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
[^] Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
[^] Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
[^] Sum of DDD + DDE + DDT	72-54-8/72-55-9/5-0-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	6
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-001	ES2414136-002	ES2414136-003	ES2414136-004	ES2414136-005
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		108	75.3	77.1	88.8	97.6
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		108	72.5	74.2	90.4	101



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	7	8	9	5	10
Sampling date / time				30-Apr-2024 00:00					
Compound	CAS Number	LOR	Unit	ES2414136-006	ES2414136-007	ES2414136-008	ES2414136-009	ES2414136-010	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%	18.1	25.8	18.9	9.7	14.1	
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	8	10	12	88	12	
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1	
Chromium	7440-47-3	2	mg/kg	17	18	18	13	16	
Copper	7440-50-8	5	mg/kg	12	16	24	14	14	
Lead	7439-92-1	5	mg/kg	14	19	41	16	34	
Nickel	7440-02-0	2	mg/kg	7	8	7	11	6	
Zinc	7440-66-6	5	mg/kg	35	86	387	39	121	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	<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	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	7	8	9	5	10
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-006	ES2414136-007	ES2414136-008	ES2414136-009	ES2414136-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
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
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	72-54-8/72-55-9/5-0-2	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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	7	8	9	5	10
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-006	ES2414136-007	ES2414136-008	ES2414136-009	ES2414136-010
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
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
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		----	----	----	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		----	----	----	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		----	----	----	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		----	----	----	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		----	----	----	<0.5	<0.5
2,4-Dimethylphenol	105-67-9	0.5	mg/kg		----	----	----	<0.5	<0.5
2,4-Dichlorophenol	120-83-2	0.5	mg/kg		----	----	----	<0.5	<0.5
2,6-Dichlorophenol	87-65-0	0.5	mg/kg		----	----	----	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		----	----	----	<0.5	<0.5
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg		----	----	----	<0.5	<0.5
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg		----	----	----	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		----	----	----	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	<0.5	0.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	7	8	9	5	10
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-006	ES2414136-007	ES2414136-008	ES2414136-009	ES2414136-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Pyrene	129-00-0	0.5	mg/kg		----	----	----	<0.5	0.6
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		----	----	----	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	----	<0.5	1.1
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	----	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	----	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg		----	----	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg		----	----	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg		----	----	----	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	----	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	170	<100
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	170	<50



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	7	8	9	5	10
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-006	ES2414136-007	ES2414136-008	ES2414136-009	ES2414136-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		----	----	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		----	----	----	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	108	102
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		76.8	101	81.3	105	86.0
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		75.7	103	78.2	107	82.9
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	92.6	87.2
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	86.6	80.4
2,4,6-Tribromophenol	118-79-6	0.5	%		----	----	----	50.8	43.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	82.7	82.3
Anthracene-d10	1719-06-8	0.5	%		----	----	----	94.5	93.4
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	87.0	85.8
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	100	99.8
Toluene-D8	2037-26-5	0.2	%		----	----	----	92.4	92.3



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	7	8	9	5	10
Sampling date / time					30-Apr-2024 00:00				
Compound	CAS Number	LOR	Unit		ES2414136-006	ES2414136-007	ES2414136-008	ES2414136-009	ES2414136-010
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	88.5	87.7



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	Duplicate	----	----	----	----
Sampling date / time			30-Apr-2024 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2414136-011	-----	-----	-----	-----
				Result	---	---	---	---
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	13.5	---	---	---	---
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	7	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	15	----	----	----	----
Copper	7440-50-8	5	mg/kg	14	----	----	----	----
Lead	7439-92-1	5	mg/kg	31	----	----	----	----
Nickel	7440-02-0	2	mg/kg	6	----	----	----	----
Zinc	7440-66-6	5	mg/kg	106	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate	----	----	----	----
Sampling date / time				30-Apr-2024 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2414136-012	-----	-----	-----	-----	-----
				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
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131

