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Kemps Creek Data Centre

Geotechnical Assessment Report

SYD05-06-07_Y-R-0003

Revision 2 | 16 April 2021

Job number 277863-00

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Executive summary

The Proponent is proposing to construct and operate a Data Centre on the site, which is legally defined as 757 – 769 Mamre Road, Kemps Creek. An Environmental Impact Statement is required to be submitted as part of the requirement for the State Significant Development application. This Statement is supported by a series of specialist technical studies. The purpose of this report is to provide geotechnical, contamination and hydrogeological technical support to the submission of the EIS report through the description of the existing ground and geological information, characterisation of the nature and extent of any contamination on the site and surrounding area, and assessment of potential impacts of the proposed design and work on the environment.

A preliminary site investigation contamination report, which presents the findings of the desktop study carried out for the site as well as the results from the limited field investigation, has been prepared as part of the assessment and characterisation of the site with respect to contamination. The laboratory results of the samples obtained from the limited field investigations were within the relevant screening levels for both human health and environmental assessment and waste soil classification. This corroborates the findings from the earlier report by JBS&G (2019), which documents the findings of the wider site environmental site assessment, involving the subject site as well as other adjacent lots. The report indicates that from a contaminated land perspective, the site is suitable for the proposed development (Warehouse, Logistics and Industrial Facilities Hub).

Taking into consideration of the existing ground data and groundwater regime, an assessment of the anticipated geotechnical work and proposed foundation system of the buildings and their impacts on the environment were undertaken. Potential impacts are documented but are anticipated to be mitigated through design and/or proper construction control.

Contents

Appendices

1 Introduction

1.1 Purpose of this report

To support the submission of the Environmental Impact Statement (EIS) in fulfilment of the SEARs, this report aims to provide a summary of the findings from the review of the following items:

- Anticipated site geology and landscape based on existing investigation reports and geological maps
- Risk of presence of potential sulfate soil in the ground
- Historical use of the site based on historical imagery
- High level review of the proposed geotechnical permanent works including foundations and earthworks to be carried out in relation to site preparation, which includes grading of the platform to suit road and building design levels and potential trench excavation for utilities installation

Following the review of the above documents and information, an assessment of the potential impact of geotechnical works to the environment is undertaken.

This report shall be read in conjunction with the attached Appendix A – Preliminary Site Investigation Contamination Report and Appendix B - Hydrogeological Assessment Report, which were also prepared to support the EIS submission.

1.2 Proposal overview

1.2.1 Site context

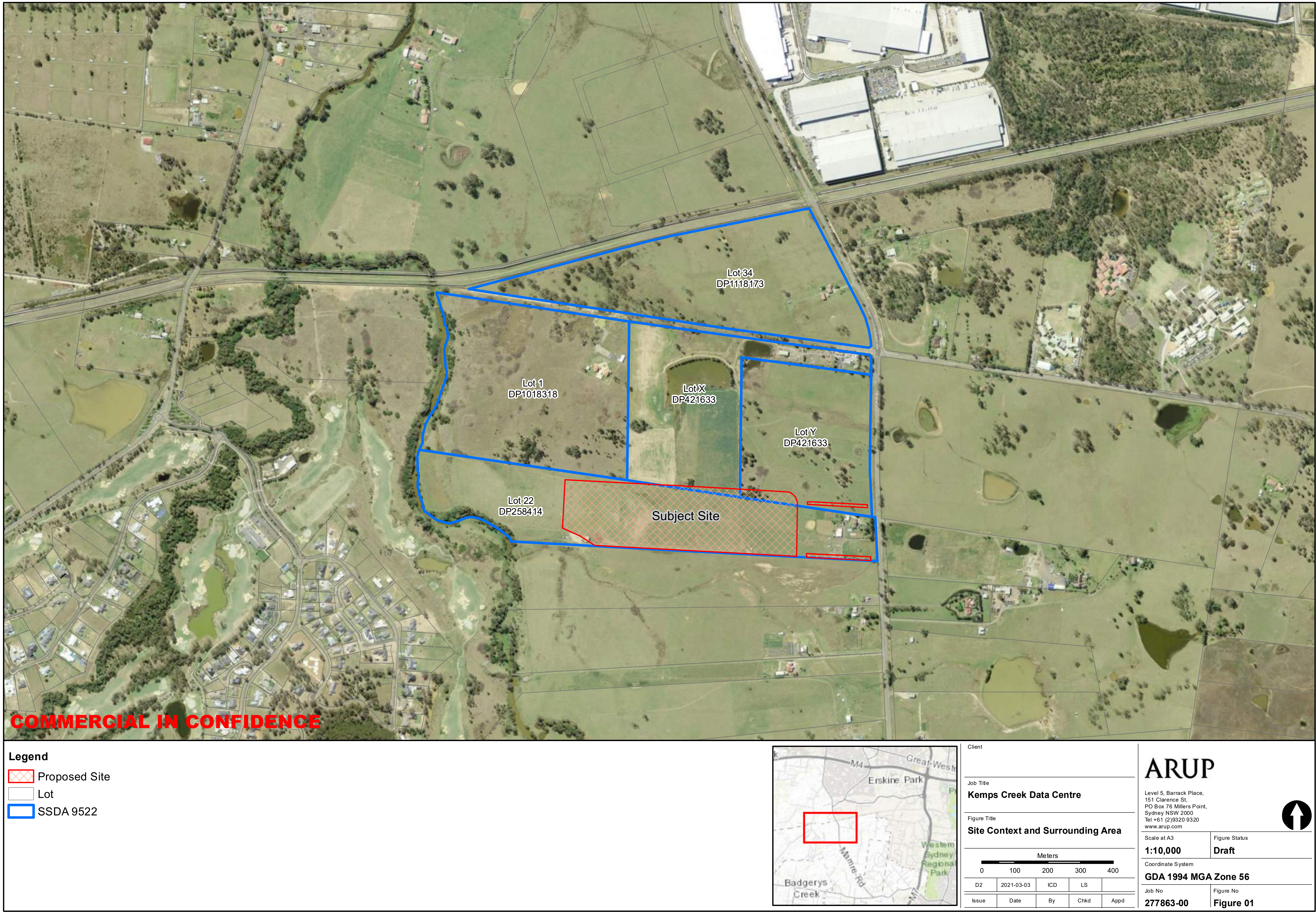
The identified site address that is the subject of this technical report is legally defined as 757-769 Mamre Road, Kemps Creek. The entire Site comprises a total area of approximately 17.38 hectares (ha) and is subject to the applicable provisions outlined within SEPP (WSEA) 2009. Access to the Site is currently obtained via the proposed Estate Access Roads (SSD 9522), which are accessed from Mamre Road. Access into the Site is made possible via Mamre Road, which is subject to future road widening as part of the Mamre Road Widening Project (Transport for NSW).

The Site is situated approximately 40.26 km west of the Sydney CBD, 22.11 km west of Parramatta and 11.97 km southeast of Penrith. It is within close proximity to transport infrastructure routes (predominantly the bus network), as well as sharing direct links with the wider regional road network, including Mamre Road and both the M4 & M7 Motorways. All of which provide enhanced connectivity to the Subject Site and immediate vicinity, as well as the wider locality.

Additionally, the Subject Site is located within close proximity to active transport links, such as bicycle routes, providing an additional mode of accessible transport available to the Subject Site. In its existing state, the Subject Site comprises an undeveloped land portion; however, it is subject to bulk earthworks and infrastructure works under a concurrent State Significant Development (SSD) Application – SSD 9522.

The Proponent is proposing to construct and operate a Data Centre on the Subject Site. The Site is located within the Penrith Local Government Area (LGA) and is zoned IN1 General Industrial under the provisions of State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP (WSEA) 2009). Development for the purpose of a Data Centre is permissible with consent within the IN1 General Industrial zone pursuant to the provisions outlined with Part 3, Division 3, Clause 27 of State Environmental Planning Policy (Infrastructure) 2007 (ISEPP).

The site and surrounding context are illustrated below in Figure 1.



Client

Job Title

Kemps Creek Data Centre

Figure Title

Site Context and Surrounding Area

D2	2021-03-03	ICD	LS	
Issue	Date	By	Chkd	Appd

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Scale at A3
1:10,000

Figure Status
Draft

Coordinate System
GDA 1994 MGA Zone 56

Job No
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Figure No
Figure 01

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Aerial Imagery: DFSI, 2020

1.2.2 Description of the proposed development

The Site will form part of the new Kemps Creek Warehouse, Logistics and Industrial Facilities Hub being developed as a joint venture between Frasers Property and Altis Property Partner under the recently approved SSD 9522 as of 21st December 2020.

The site layout has been developed for three data centres for a total of (3 x 48MW) 144MW capacity. Full detailed design is currently underway for two 48MW centres, with the third data centre being designated as a future build. The design of these which are based on the end-client’s reference design as well as applicable Australian standards.

The proposed data centres are 2-storeys high with no basements. The preliminary design of the structures dated 18 December 2020 indicates that the upper floors will be supported by columns with piled foundations while the ground floor slab will be suspended slab supported on piles. It is also worth noting that prior to the handover of the site, the existing site elevation will be raised through earthwork of fill up to 3.5m thick by Others. Further discussion of the foundation and earthworks is provided in Section 5.

1.3 SEARs and DCP requirements relevant to this report

Table 1-1 identifies the SEARs and DCP requirements which are relevant to this technical assessment.

Table 1-1: SEARs and DCP requirements for Soils and Water (Geotechnical, Contamination and Hydrogeology)

SEARs relevant to this technical report	Where addressed in this technical report
SEARS: A topographic assessment and justification demonstrating the proposed earthworks are responsive and contextually appropriate	Section 5
SEARS: An assessment of potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby	Appendix B
SEARS: Characterisation of the nature and extent of any contamination on the site and surrounding area	Appendix A
DCP requirements	**Where addressed in this technical report**
Draft DCP (Salinity - Section 2.9) – Control 1: A detailed salinity analysis and Salinity Management Plan will be necessary if an initial investigation shows the site is saline or affected by salinity.	Appendix A
Draft DCP (Salinity - Section 2.9) – Control 5: Groundwater recharge shall be minimised	Appendix B
Draft DCP (Salinity - Section 2.9) – Control 8: Construction techniques shall be employed that prevent structural damage to the development as a result of salinity (see Building in a Saline Environment). For example, building footings shall be constructed so as not to impede groundwater movement and building materials that are resistant to salt effects shall be used.	Appendix B
Draft DCP (Contamination – Section 2.10) – Control 2: All DAs shall be accompanied by a Stage 1 Preliminary Site Investigation prepared in accordance with State Environmental Planning Policy No 55 – Remediation of Land and the Contaminated Land Management Act 1995.	Appendix A
Draft DCP (Contamination – Section 2.10) – Notes: All applicants should consider and assess contamination hazards on their land in accordance with the Contaminated Land Management Act 1995 and State Environmental Planning Policy No 55 – Remediation of Land, both of which override any controls in this DCP.	Appendix A

Draft DCP (Riparian Zones – Section 2.5) – Control 5: Existing flows of surface and groundwater should not be altered through construction of channelled flows or the redirection or interruption of flows.	Appendix B
Note: *This report is to be read in conjunction with the attached Preliminary Site Investigation Contamination Report (Appendix A)and Hydrogeological Assessment Report (Appendix B)*	

2 Policy and planning context

The policies and guidelines adhered to in this report are summarised in Table 1.

Table 1: Policies related to this report

Policy
Soil and Landscape Issues in Environmental Impact Assessment, 2000
Draft Mamre Road Precinct Development Control Plan (DCP)
Contaminated Land Management Act 1997 (CLM Act)
State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55)
Managing Land Contamination Planning Guidelines SEPP 55 **-** Remediation of Land (Department of Urban Affairs and Planning and EPA 1998) (Planning Guidelines)
NSW EPA (2020). Consultants reporting on contaminated land – Contaminated land guidelines
National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended in 2013 (ASC NEPM)
PFAS National Environmental Management Plan 2020
NSW State Groundwater Policy Framework Document 1997
NSW State Groundwater Quality Protection Policy 1998
NSW Aquifer Interference Policy 2012
Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011
Water Management Act 2000
Water Act 1912
Storing and Handling Liquids: Environmental Protection (DECC), 2007
National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia 2000
Risk Assessment Guidelines for Groundwater Dependent Ecosystems 2012
NSW State Groundwater Dependent Ecosystems Policy 2002

3 Methodology

3.1 General

In order to assess the impact of the proposed geotechnical work on the environment, a geotechnical desktop study has been carried out. Coupled with the findings from the Preliminary Site Investigation Contamination Report **(Appendix A)** and Hydrogeological Assessment **(Appendix B)**, the existing ground conditions of the site from perspectives of subsurface geology, contamination potential and hydrogeology have been established.

This understanding of existing conditions was considered with the proposed geotechnical works to understand likely impacts.

This report details the findings of the geotechnical study, cross references are made to the Preliminary Contamination Site Investigation **(Appendix A)** and

Hydrogeological Assessment **(Appendix B)**. The assessment methodologies for Contaminated Land and Hydrogeology are covered in their respective reports, hence are not included here. The findings of those reports are relied upon and discussed in Section 5 to 7.

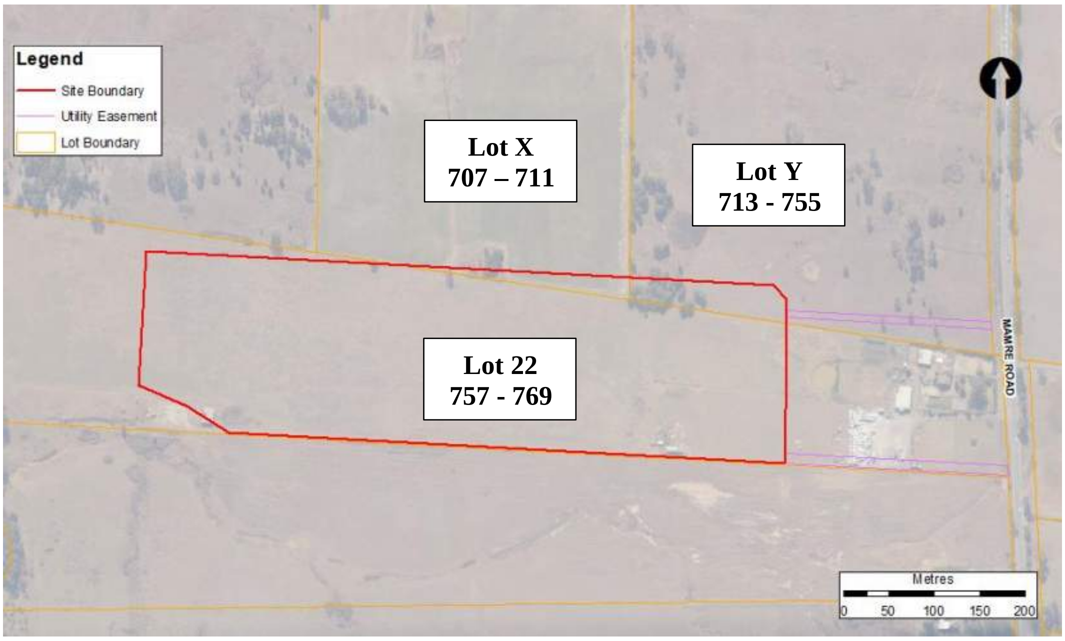
3.2 Study area

The study area of this assessment falls within the site boundary and the utility easement boundary as shown on Figure 2. The same Figure 2 shows that the site extends across three (3) allotments, which have been tabulated in Table 2.

Table 2: Allotments within which the study area is located

Street Address	**Legal Description**
707 – 711 Mamre Road, Kemps Creek	Lot X DP 421633
713 – 755 Mamre Road, Kemps Creek	Lot Y DP 421633
757 – 769 Mamre Road, Kemps Creek	Lot 22 DP 258414

Figure 2: Study area



3.3 Geotechnical Desktop Study

The following documents were reviewed to inform this assessment:

- Published site geology, soil landscape and topographic maps such as:
    - NSW Seamless Geology [1]
    - NSW Soil landscape [2]
- Acid Sulfate Soils Risk Data Map [3] & [4]
- Historical aerial photographs

- Existing investigation reports (PSM, Results of Geotechnical Investigation, Ref: PSM3276-115L, 19 May 2020)
- Earthworks drawings (Drawing No.: CICW0001 to CICW0003 and CICW0005 to CICW0006) (attached as Appendix C)

4 Existing environment

To provide information on the geological feature underlying the site, a review of the New South Wales Seamless Geology [1] and the soil landscape [2] was undertaken, which would provide information on the general sub-surface geological profile of the site.

4.1 Site History

The review of the historical aerial photographs will be undertaken through identification of the changes in land use/ development that has happened over the years. Primarily, publicly available photographs such as Google Imagery are used as the source of information. However, in this instance, Arup has also engaged Lotsearch Pty Ltd (Lotsearch) to complete a search of publicly available databases in conjunction with the preliminary contamination site investigation (see **Appendix A**).

As noted in Appendix A, the site has been used predominantly for agriculture purposes. A reference to the Google Earth historical imagery also corroborates that the site has been used consistently for farming since 2002. Several farm dams were observed on the historical images from 2002 (Figure 3). However, they were not present in the recent aerial image (Figure 4). Based on a recent site visit in early January 2021, the site was overgrown by grass and the farm buildings seemed to have been abandoned.

Figure 3: Historical Google Imagery 2002 (Google Earth Pro) marked with Site boundary and utility corridors

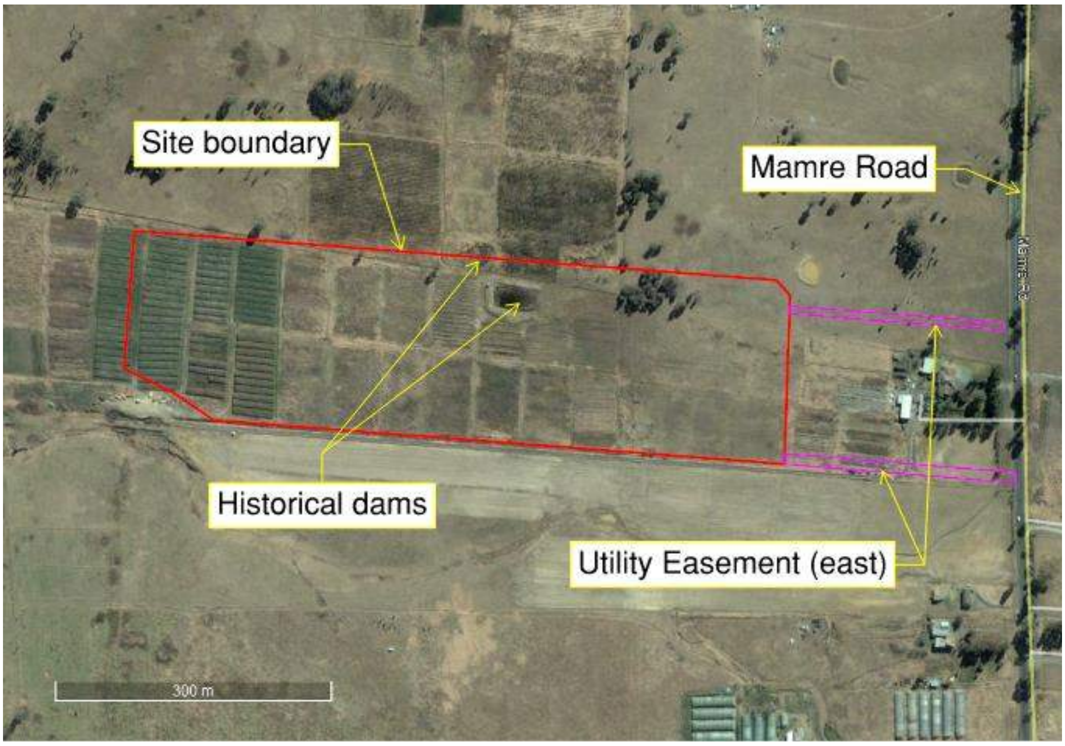
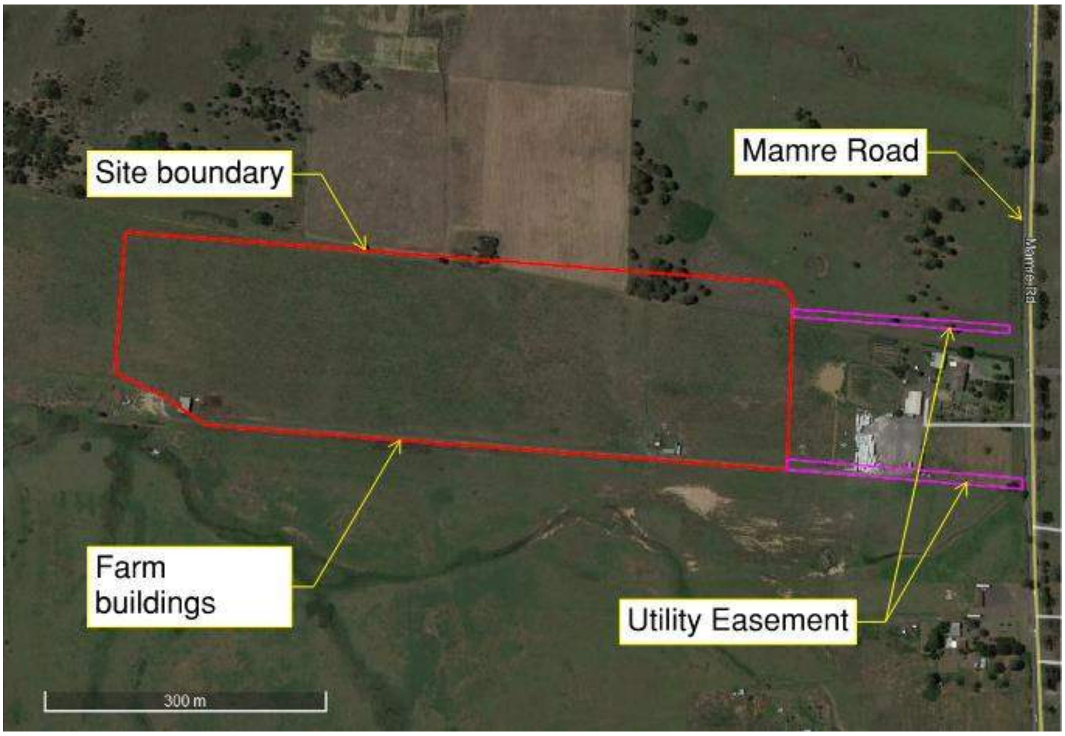


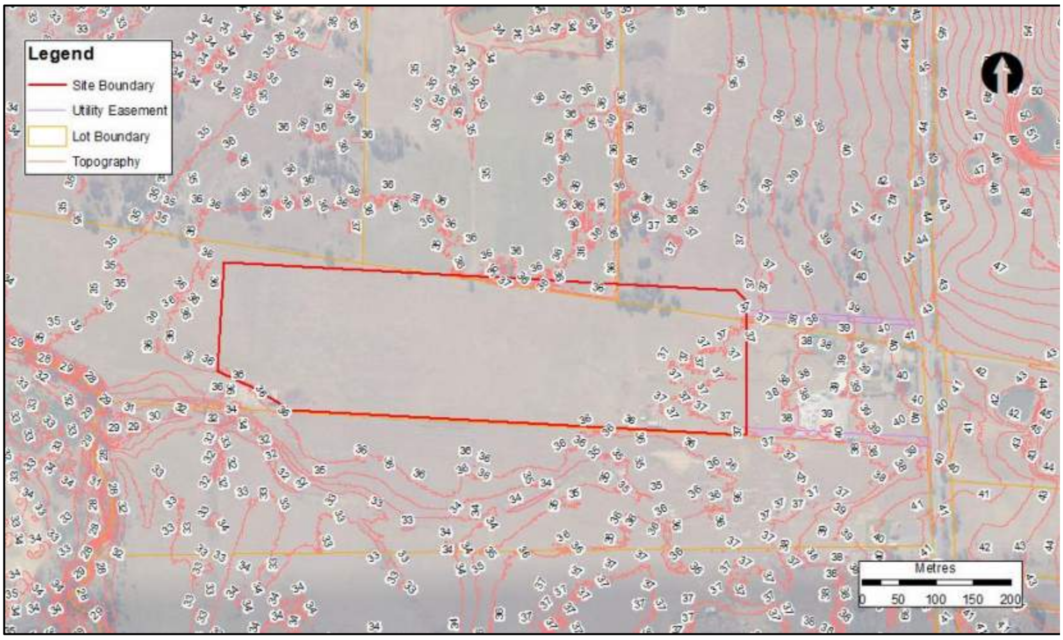
Figure 4: Recent Google Imagery aerial photograph (2018) (Google Earth Pro) marked with Site boundary and utility corridors



4.2 Topography of the site

The topography of the site comprises a relatively flat area which gently slopes down in an east to west direction from approximately +37.0 to 36.0mAHD, as can be seen in Figure 5.

Figure 5: Topography of the site



Bulk earthworks (fill up to approx. 3.5m) will be carried out by Others to raise the platform level prior to site handover to the proponent for the construction of the proposed Data Centre. The different levels (existing, platform, formation and design) are described in Section 5.

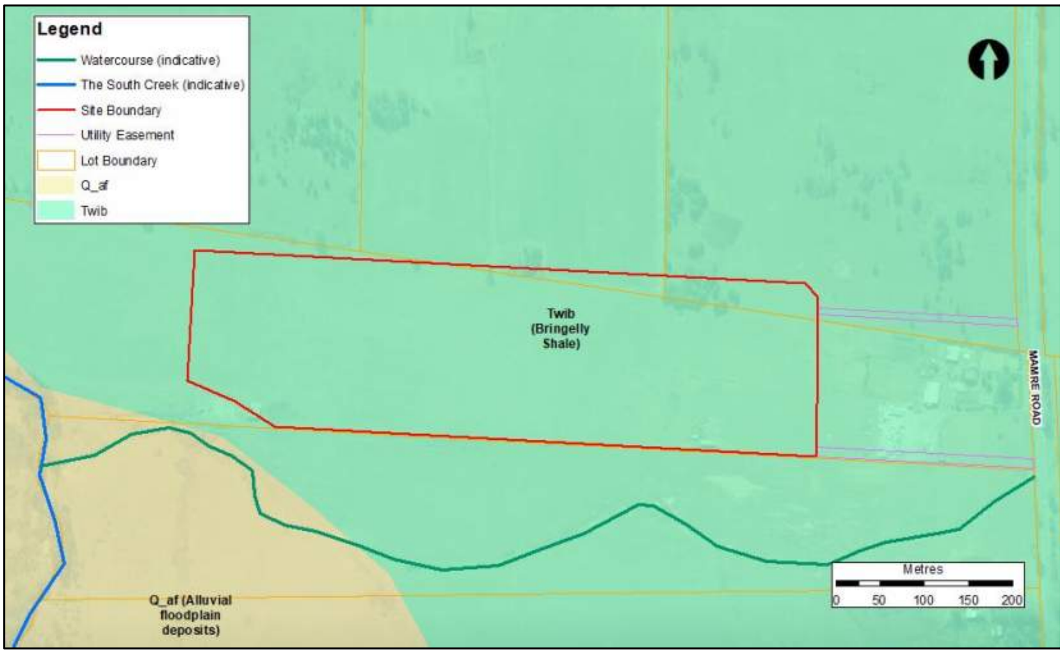
4.3 Site Geology and Soil Landscape

A reference to the New South Wales Seamless Geology dataset [1] indicates that the site is underlain by Wianamatta Group formation. The formation comprises Bringelly Shale (Twib) of the middle Triassic age, which is described as shale, carbonaceous claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff.

Consistent with the proximity of the South Creek to the west of the site, the seamless geology dataset also shows alluvium deposits (Qaf), which are described as fine-grained sand, silty and clay of the Quaternary age to the west of the site.

Illustration showing the site boundary overlain on the geological map is presented in Figure 6.

Figure 6: Underlying geology setting of the site (New South Wales Seamless Geology dataset [1])



On the other hand, a reference to the eSPADE soil landscape mapping [2] indicates that site is underlain by the South Creek soil landscape group, which is made up of quaternary alluvium derived from Wianamatta Group shales and Hawkesbury Sandstone. Soils associated with this landscape group is often described as very deep layered sediments over bedrock or relict soils. Also indicated by the soil landscape mapping is that the topography is expected to be flat to gently sloping (alluvial plain; slopes up to 5%) with occasional terraces or levees.

4.4 Geotechnical Investigation Information

4.4.1 Existing investigation reports

A geotechnical investigation was undertaken by PSM in April 2020 for the purpose of verifying the ground conditions further to the findings of a desktop study of the proposed site. A review of this report was carried out to provide information on:

- The type of ground conditions that can be expected underlying the site
- The material that may potentially be removed during construction due to proposed geotechnical works
- Verification of the information from the site geology and soil landscape study

PSM [5] reported augering through soils was undertaken in five (5) boreholes with HQ rock coring carried out in one borehole (BH2).

The results of the investigation indicate that the soil is made up primarily of clay with gravelly or sandy secondary component. Bedrock comprising of shale was encountered at approximately 7 to 9m below ground level.

4.4.2 Arup 2021 investigation

A geotechnical investigation was recently carried out by Arup between 5th - 12th January 2021 and at the time of writing, the factual report was being prepared. The purpose of the investigation was to provide information on the following:

- the stratigraphy underlying the site,
- the nature and properties of the soil and rock (including rock quality) and
- the groundwater levels

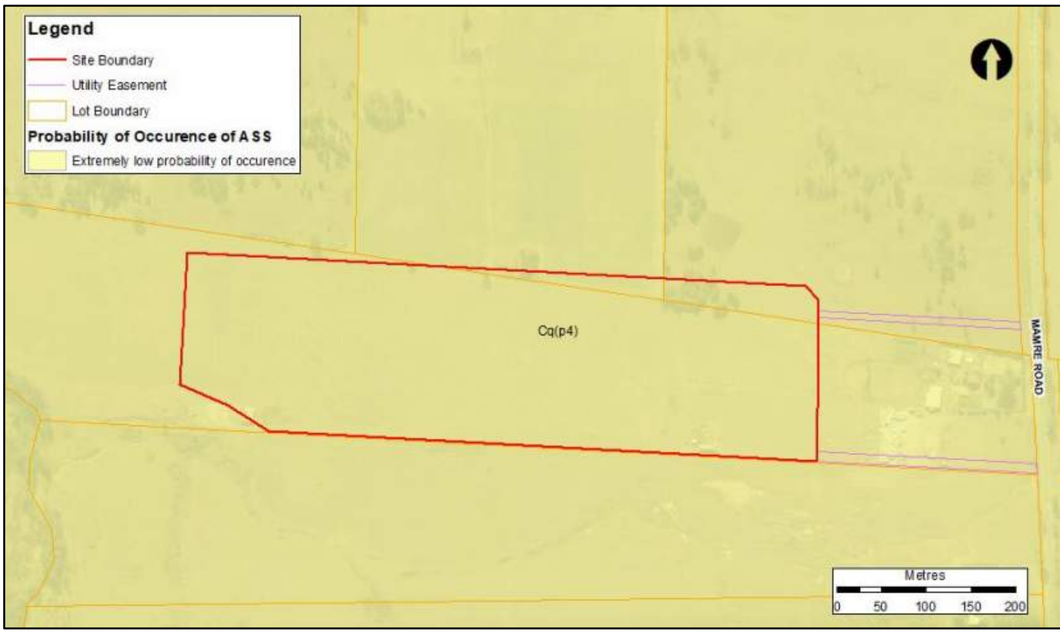
A total of 18 nos. of boreholes were drilled, which included 8 nos. with HQ rock coring. A reference to the results indicates that the underlying soil is made up of residual gravelly/ sandy/ silty clay or clayey/ sandy silt with intermediate sand layer. Bedrock comprising predominantly of layers of laminated siltstone and sandstone was encountered approximately 6.5 to 11m below ground level.

Laboratory geotechnical testing of the soil and rock samples were also undertaken as part of the investigation. Additionally, laboratory testing for contamination sampling and assessment were carried out for the top 1.5m of soil. Further details of sampling and testing for contamination can be found in Appendix A.

4.5 Potential for Acid Sulfate Soil

Acid sulfate soil (ASS), when disturbed or exposed to air can release acid, which can cause damage to the environment and to structural elements. The NSW acid sulfate risk data map as well as the National Atlas of acid sulfate soil of Australia has been reviewed as part of the process to identify the presence of ASS. Figure 7 presents a figure of the site boundary overlaid on the Atlas of Australian Acid Sulphate Soils map, this indicates that there is an extremely low probability of ASS occurrence within the upper 1m of ground with potential ASS. It is also stated that the classification is provisional because necessary analytical data is not available. Further reference to the Department of Planning, Industry and Environment Acid Sulfate Soils Risk Data Map confirms that no assessment on ASS has been carried out at or near the vicinity of the site. Acid sulfate soil (ASS) can cause significant negative implications when disturbed or exposed.

Figure 7: Acid Sulfate Soil Map of the Site



5 Assessment of potential construction impacts

This section discusses the proposed ground works that will be undertaken as part of the permanent Project works.

5.1 Proposed geotechnical works

Geotechnical works that may induce disturbance and/or movement of earth materials including, but not limited to, excavation, construction of foundations and preparations of formation level. No basements are proposed. Excavation for preparation of subgrade and for localised civils features will be required.

The assessment of potential construction impacts takes into consideration the Site topography, the anticipated sub-surface ground profile, anticipated earthworks and foundations required for the permanent Project works.

Based on the available information at this stage, foundation in the form of piles socketed in rock is proposed.

The site level will be raised prior to being handed over for the development of the Project. Additional earthworks will be required as part of the Project development to form a level that suits the proposed building and road layout. Further discussion on each of the proposed ground works and its impacts are provided in the following sub-sections.

5.1.1 Foundations

Currently it is envisaged that the building will be piled to rock with either a suspended or ground bearing ground floor slab (to be confirmed through design development and further information on the earthworks undertaken prior to Site handover).

It is envisaged that piles will be bored and cast in-situ using one of the following methods:

1. Conventional boring or augering (with temporary casing through superficial deposits and non-self-supporting materials) an open bore through the ground to the required depth, installation of the reinforcement cage and subsequently concreting of the pile. Sometimes a support fluid to maintain stability of the open bore is employed (using fluids such as bentonite, polymer fluids and sometimes plain water is used).
2. Continuous flight augering (CFA) screwed through the ground to the required depth, as the auger is extracted concrete is pumped through a central tube through the tip of the auger tool. The reinforcement cage is installed by plunging through the fresh concrete.

Both methods are 'replacement' methods by which soil is removed and replaced by reinforced concrete.

With reference made to Appendix A and Appendix B, considerations for assessment of environmental impact include:

- *Considerations include presence of contaminants*

  The construction of rock socketed piles will involve removal of material (fill, alluvium, residual soil and rock) from the ground. The materials removed from the ground will need to be assessed for potential reuse and/or offsite disposal in accordance with the EPA Waste Classification Guidelines – the Construction Environmental Management Plan (CEMP) prepared for the Project should include a 'spoil management plan' and an 'unexpected finds protocol' to manage potentially contaminated materials.

  Potential for migration of any such contaminants from the removed materials whilst stored on site could also be induced during rainfall events through rainwater leaching and runoff into stormwater drains and surface waters.

  Reference to the Preliminary Site Investigation Contamination Report (**Appendix A**) indicates that the limited soil investigation did not identify chemicals of potential concern (COPC) that exceeded the relevant investigation and screening levels.

- *Sodic Soils*

  Soils at the Site are anticipated to be highly sodic – sodic soils in arisings will require management – this should be set out in the CEMP (**Appendix A**).

- *Saline Soils*

A detailed salinity analysis will be undertaken and Salinity Management Plan will be prepared since the initial investigation shows the site is affected by salinity **(Appendix A**).

The engineering design will address durability issues introduced by the presence of saline soils – in particular for in-ground elements. Refer also to groundwater movement flow impediment considerations below.

- *Reduced rainfall recharge to the water table*

  Cumulative impacts with respect to reduced rainfall recharge due to the emplacement of paved areas and roofing of buildings are expected. Impacts to reach fully developed form upon completion of construction. However, due to the small site area relative to the surrounding area, the impact is expected to be minor. Further discussion on the groundwater existing setting and environment and conceptual model is given in **Appendix B**.

- *Alteration of groundwater flows due to piled foundations*

  At the time of writing, the buildings are expected to be supported by rock socketed piled foundations. As such, groundwater flow may be affected due to the reduced cross-sectional flow area created by the piles. As noted in **Appendix B**, such impact is expected to be minor as a component of the groundwater flux would be diverted around the sites of the development and there are no known subsurface barriers that would inhibit this diversion. Similarly, the impact on the groundwater flux to the identified groundwater-dependent ecosystem to the south west of the site is assessed to have only a slight probability.

- *Alteration of natural waterways due to inappropriate disposal of drilling mud*

  During the boring of piles, it is not uncommon for casings or support fluid such as polymer or bentonite to be used to support the temporary excavation. Although biodegradable, the support fluid if disposed inappropriately such as into watercourses may affect and alter its natural behaviour.

- *Siltation due to silt and dust generated from excavation and construction*

  It is not uncommon for silts and dust to be generated during the construction of piles and ground formation works. As these materials are easily transportable by water medium, they may be deposited in watercourses, and altering its natural behaviour. Further discussion sedimentation is found in the Stormwater and Flooding report (Arup, 2021).

5.1.2 Earthworks

To assess the potential construction impact due to the proposed works, earthworks drawings (Appendix C) have been reviewed to identify works that may result in potential removal from or introduction of earth materials into the site.

The proposed work takes into consideration the platform level at handover and the final design level to minimise additional work and maintain a scale of work appropriate to the development context.

The additional earthwork to configure the site to a formation level that suits the building and road layout involves further cutting and filling of up to 1.3m height is expected with a net import of approx. 9500m^3 (based on the earthworks drawings in **Appendix C**). The imported material should be classified as suitable for future commercial/industrial use of the site.

The cut will be through new earthworks undertaken prior to site handover only. It is understood that these earthworks will be free of contaminants, hence the risk of presence of contaminant in the soil to be removed from site as part of the earthworks is anticipated to be very low.

Trenching work is also required to facilitate the installation of utilities from Mamre Road into the site. Although the trenches are up to be 1.5m wide, it is not anticipated to have a significant impact on the overall assessment since the testing of the samples from the boreholes along the utility easement did not return any contaminants that exceed the screening levels. Further discussion is provided in **Appendix A**.

With reference made to Appendix A and Appendix B, considerations for assessment of environmental impact include:

- *Contamination, saline and sodic soils*

  The presence of contamination, sodic or saline soils is a risk to the environment and must be assessed accordingly in the CEMP during the construction of the Project.

  Since there is a net import of material, an imported materials management protocol will be implemented such that only suitable materials are imported onto the site (i.e. non-saline, non-sodic soil/fill material that is suitable for commercial/industrial land use).

References

1. Colquhoun G.P., Hughes K.S., Deyssing L., Ballard J.C., Folkes C.B, Phillips G., Troedson A.L. & Fitzherbert J.A. of Geological Survey of New South Wales, Department of Regional NSW, Maitland, (2020). New South Wales Seamless Geology dataset, version 2.0 [Digital Dataset]
2. Department of Planning, Industry and Environment, NSW, 2020. eSPADE version 2.1. https://www.environment.nsw.gov.au/eSpade2Webapp, accessed 15 January 2021
3. Department of Planning, Industry and Environment, – Acid Sulfate Soils Risk, Acid Sulfate Soils Risk Data Map, https://datasets.seed.nsw.gov.au/dataset/acid-sulfate-soils-risk0196c, accessed 15 January 2021
4. Fitzpatrick, Rob; Powell, Bernie; Marvanek, Steve, 2011. Atlas of Australian Acid Sulfate Soils, v2 (CSIRO) Data Collection.
5. PSM, 2020. Proposed Development – 769 Mamre Road, Kemps Creek: Results of Geotechnical Investigation

Appendix A

SYD05-06-07_Y-R-0004 Preliminary Site Investigation Contamination Report

Confidential

Kemps Creek

Preliminary Site Investigation Contamination Report

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Executive summary

Arup were engaged by the client (“the Proponent”) to provide technical advice and design for the construction of a Data Centre at 707-769 Mamre Road, Kemps Creek, New South Wales (“the Subject Site”), as shown in Figure 1. The Subject Site occupies a total footprint of approximately 17.38 hectares (ha).

The purpose of this report is to document the findings from the preliminary contamination site investigation (PSI) to support the submission of the environmental impact statement (EIS) report as part of the requirement for state significant development application in fulfilment of the SEARs.

The objectives of the PSI were to:

- Identify potential sources of contamination within the Subject Site, including the relevant COPC and develop an initial conceptual site model (CSM)
- Investigate and assess the quality of in-situ soils in relation to the relevant environmental values and waste classification guidelines.

This investigation was undertaken in general accordance with guidance provided in EPA Contaminated Land Guidelines: Consultants reporting on contaminated land [9] and the National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013 (ASC NEPM) (NEPC, 2013) [11].

The desktop review identified a number of potential sources of contamination relating to the current and historical use of land within and adjacent to the Subject Site, including:

- Infilling of dams with fill material of unknown quality
- Demolition of buildings and structures constructed prior to 1990s, including building and demolition waste
- Agricultural/farming land use, including cattle yard and fertiliser storage area

The COPC relevant to the sources of contamination include asbestos, heavy metals, PAHs, phenols, PCBs, TRHs/BTEX, OCC/OPPs, herbicides and fertilisers. These are likely to occur in shallow, surficial soils within localised areas of historical construction, demolition and agricultural use.

Further, the JBS&G (2019b) Site Salinity Assessment identified the potential for regional salinity and sodicity characteristics to exist within natural soils at the Subject Site and surrounding areas. Soils on upper and lower slopes were considered to be moderately and slightly saline respectively, with elevated salinity present in the deeper (>1 m below ground surface) soil profiles. Soils present within all site landforms were reported to be ‘highly sodic’. Based on the JBS&G (2019b) report, the potential for acid sulfate soils was low and did not require further management was required during site development.

The findings from the limited soil investigation comprising sampling and analysis of shallow soils from 16 borehole locations, indicated the following:

- The generalised soil profile at the Subject Site comprised silty clay topsoil overlying residual Bringelly Shale (sandy/silty/gravelly clay or sandy/clayey silt with intermediate clayey/silty sand)
- Potential asbestos containing materials (e.g. bonded cement sheets) were not observed in the boreholes
- Trace concentrations of PFOS and PFOA were detected in four samples (ABH-A10 1.0m, ABH-C2 0.5m, ABH-P3 0.5m and ABH-P4 0m). These concentrations were orders of magnitude below the relevant human health and environmental screening levels and below the SCC for 'General Solid Waste' and PFAS NEMP (2020) Landfill Disposal Criteria
- Concentrations of heavy metals were reported to be either below the laboratory LOR or below the relevant human health and environmental screening levels and below the SCC for 'General Solid Waste'
- Concentrations of PAHs, phenols, OCPs, OPPs, PCBs and phenoxyacetic acid herbicides in all samples were reported to be below the laboratory LOR
- Concentrations of COPCs, where detected, did not exceed the maximum values of specific contaminant concentration (SCC) for 'General Solid Waste'

An assessment of groundwater quality was beyond the scope of the investigation; however groundwater levels were identified to range from 1.3 to 4.9 mBGL in the four standpipes installed at the Subject Site.

Further sampling and analysis of soils is recommended in areas of environmental concern where potential sources of contamination have not been investigated, including:

- Potential soil contamination related to the building and demolition waste identified in the south western and eastern portions of the Subject Site
- Potential soil contamination related to the cattle yard and fertiliser storage area in the south eastern portion of the Subject Site
- Footprints and immediate surrounds of existing and historical buildings and structures for potential hazardous materials, including asbestos containing materials

A CEMP is required for the redevelopment of the Subject Site. The CEMP should include, but not be limited to the following:

- Site salinity management plan to address sodicity and saline nature of soils
- Unexpected finds protocol to ensure adequate assessment and management of risks relating to potential contamination
- Spoil management plan to address to classification of spoil and wastes

- Imported fill material management plan to ensure the material is suitable for the future commercial/industrial use of the Subject Site

The conclusions and recommendations should be read in conjunction with the limitations in Section 8.

Contents

Appendices

1 Acronyms

Table 1: Table of acronyms

Acronym	Definition
ACM	Asbestos-containing materials
AEC	Area of environmental concern
AHD	Australian Height Datum
ASC NEPM	Assessment of Site Contamination National Environmental Protection Measure
ASS	Acid Sulfate Soil
BGL	Below ground level
BTEX	Benzene, toluene, ethylbenzene, xylene
CEMP	Construction environmental management plan
CSM	Conceptual site model
COPC	Chemicals of potential concern
DCP	Development Control Plan
EIS	Environmental Impact Statement
EIL	Ecological Investigation Level
ESL	Ecological Screening Level
EPA	Environment Protection Authority
ESA	Environmental site assessment
HIL	Health Investigation Level
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LGA	Local Government Area
LOR	Limit of reporting
mAHD	Metres Australian height datum
mBGL	Metres below ground level
MW	Megawatts
NATA	National Association of Testing Authorities
NSW	New South Wales
OCC	Organochlorine pesticides
OCP	Organochlorine pesticide
OPP	Organophosphorus pesticide
PAH	Polycyclic aromatic hydrocarbon
PCBs	Polychlorinated Biphenyls
PFAS	Per-and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid

PFOS	Perfluorooctane sulfonic acid
PID	Photo ionisation detector
POEO Act 1997	Protection of the Environmental Operations Act 1997
PSI	Preliminary site investigation
SEARS	Secretary’s Environmental Assessment Requirements
SEPP	State Environmental Protection Policy
SSA	Site salinity assessment
SSD	State significant development
TRH	Total recoverable hydrocarbons
VOC	Volatile organic compounds

2 Introduction

Arup has been engaged by the client (“the Proponent”) to provide technical advice and design for the construction of a Data Centre at 707-769 Mamre Road, Kemps Creek, New South Wales (“the Subject Site”) (refer to Figure 1).

The Subject Site will form part of the new Kemps Creek Warehouse, Logistics and Industrial Facilities Hub being developed as a joint venture between Altis Property Group (Altis) and Frasers Property (Frasers) under the recently approved SSD 9522 as of 21st December 2020.

The Subject Site layout has been developed for three data centres for a total of (3 x 48MW) 144MW capacity. Full detailed design is currently underway for two 48MW centres, with the third data centre being designated as a future build. The design of these which are based on the end-client’s reference design as well as applicable Australian standards.

2.1 Project background

The former landowners, Altis and Frasers have previously engaged JBS&G Australia Pty Ltd (JBS&G) to carry out a preliminary site investigation (PSI) and subsequently an environmental site assessment (ESA) on the three land parcel as part of an investigation that involves a wider assessment area in 2018 and 2019 respectively. The PSI and ESA carried out by JBS&G covers the following sites (lots):

- Lot 34: 657-703 Mamre Road
- Lot 1: 707A Mamre Road
- Lot X: 707-711 Mamre Road
- Lot Y: 713-755 Mamre Road
- Lot 22: 757-769 Mamre Road.

The ESA assessed that the wider site did not have gross and/or widespread contamination and further assessment through 48 intrusive investigations, field screening of site media and laboratory analysis for chemicals of potential concern (COPC) did not identify any COPCs that exceeded relevant site screening assessment criteria for commercial/industrial land use site suitability. As such, from a contaminated land perspective, the report concluded that the wider site is suitable for the proposed development; the Kemps Creek Warehouse, Logistics and Industrial Facilities Hub).

A Scoping Report for the proposed Data Centre development (Lot X, Y and 22) prepared by WillowTree Planning Pty Ltd on behalf of Arup in October 2020 was submitted to the NSW Department of Planning, Industry and Environment (DPIE) in support of a formal request for Secretary’s Environmental Assessment Requirements (SEARs). The SEARs were subsequently issued in late November 2020. The SEARs and DCP requirements relevant to this report are provided in Table 2.

Table 2: SEARs and DCP requirements for Soils and Water (Geotechnical, Contamination and Hydrogeology)

SEARs relevant to this technical report	Where addressed in this technical report
SEARS: Characterisation of the nature and extent of any contamination on the site and surrounding area	Section 3 to 7
Draft DCP (Salinity - Section 2.9) – Control 1: A detailed salinity analysis and Salinity Management Plan will be necessary if an initial investigation shows the site is saline or affected by salinity.	Section 7
Draft DCP (Contamination – Section 2.10) – Control 2: All DAs shall be accompanied by a Stage 1 Preliminary Site Investigation prepared in accordance with State Environmental Planning Policy No 55 – Remediation of Land and the Contaminated Land Management Act 1995.	This report
Draft DCP (Contamination – Section 2.10) – Notes: All applicants should consider and assess contamination hazards on their land in accordance with the Contaminated Land Management Act 1995 and State Environmental Planning Policy No 55 – Remediation of Land, both of which override any controls in this DCP.	Section 3 to 7

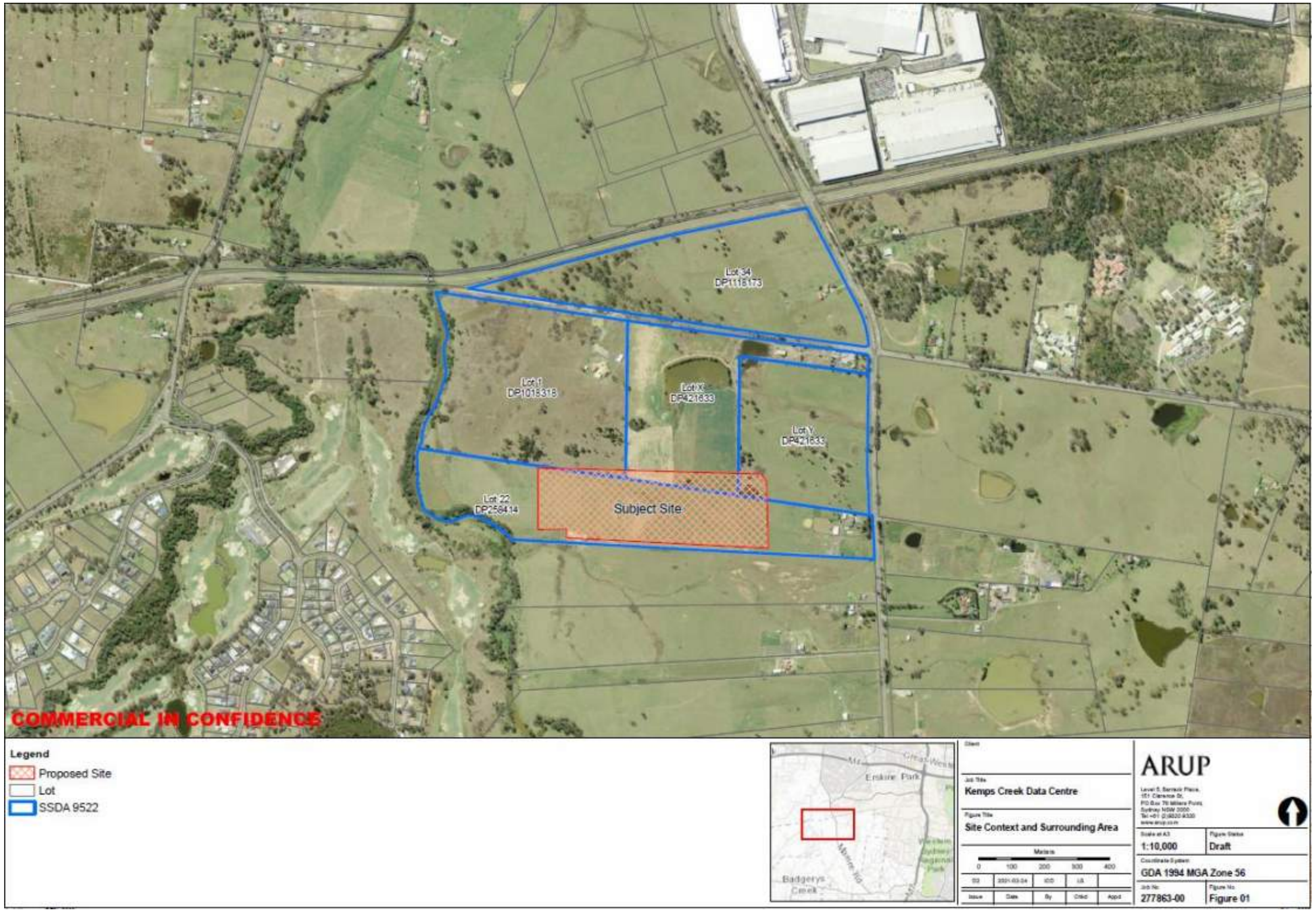

Figure 1: Subject Site and Surrounding Area (WillowTree, 2020)

2.2 Purpose and objectives

The purpose of this report is to document the findings from the preliminary contamination site investigation (PSI) to support the submission of the environmental impact statement (EIS) report as part of the requirement for state significant development application in fulfilment of the SEARs.

The objectives of the PSI were to:

- Identify potential sources of contamination within the Subject Site, including the relevant COPC and develop an initial conceptual site model (CSM)
- Investigate and assess the quality of in-situ soils in relation to the relevant environmental values and waste classification guidelines.

This investigation was undertaken in general accordance with guidance provided in EPA Contaminated Land Guidelines: Consultants reporting on contaminated land [9] and the National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013 (ASC NEPM) (NEPC, 2013) [11].

2.3 Scope of works

The scope of works comprised a desktop review of historical reports and publicly available information, a limited soil investigation and preparation of this report.

The desktop study comprised the following tasks:

- Review of the environmental setting of the site and surrounding areas including current land use, zoning, geological, hydrogeological, hydrological and topographical maps
- Review of available historical contaminated land assessment reports and other related information
- Review of publicly available information from EPA databases, including environmental audit reports, priority sites register, waste management facilities and per- and polyfluoroalkyl substances (PFAS) investigation sites
- Review of historical aerial photographs
- Compilation of information into a chronology of the Subject Site history.

The limited field investigation comprised the following activities:

- Drilling of 18 boreholes which comprised 10 auger-only boreholes and eight coreholes
- The boreholes ranged in depth from 3 m to 18 m below ground level (mBGL)

- During auger drilling, soil samples were collected for logging the geological profile, sampling of soils and field screening for volatile contaminants using a photo ionisation detector (PID)
- In the eight coreholes, rock core samples were collected and stored in core boxes for geotechnical logging and laboratory testing
- Laboratory analysis of soil samples for COPC and comparison with relevant investigation and screening levels, including waste classification guidelines
- Preparation of this report.

To support the development of this report, Arup engaged Lotsearch Pty Ltd (Lotsearch) to compile a report of environmental data that was used in the preparation of this PSI report (refer to Appendix A).

3 Site description

3.1 Site details

A summary of the site details is presented in Table 3.

Table 3: Site details

Site details	
Address	707-769 Mamre Road, Kemps Creek, NSW 2178
Total area	17.38 hectares (ha)
Municipal authority	Penrith City Council
Zoning	• General Industrial (IN1) • Infrastructure (SP2)
Land use within Site	Previous: • Agricultural – predominant historical land use
	Current: • Vacant land
Surrounding land use	**North:** • The land to the north of the Subject Site is largely vacant with some agricultural land use • There is some remnant native vegetation. **East:** • Mamre Road is located to the east of the Subject Site • Beyond Mamre Road is vacant, agricultural and farmland/residential land use. **South:** • The land to the south of the Subject Site is largely vacant with farmland/residential land use • An unnamed tributary runs east-west to South Creek • Residential dwellings occupy land to the south-west of the Subject Site. **West:** • South Creek is located to the west of the Subject Site • Low-density residential land use is located beyond South Creek.

3.2 Environmental Setting

The environmental setting within the study area is presented in Table 4.

Table 4: Environmental setting

Item	Description
Topography	The surface area over the Subject Site is relatively flat (gently sloping down from east to west) with elevation ranging from 36 to 37 mAHD.
Hydrology	The Subject Site, while is not intersected by any watercourses, is located just to the east of South Creek with another watercourse running almost in parallel to the southern boundary of the Subject Site.
Hydrogeology	The Subject Site is not known to be part of any catchment area. Groundwater flow in the area is inferred to be from the high ground in the east of the site towards South Creek on the west.
Geology and Soils	The Subject Site is underlain by Bringelly Shale of the middle Triassic period (eastern portion) and by fine-grained sand, silt and clay (western portion). Site investigations undertaken within the Subject Site indicate that the sub-surface ground profile at the site typically comprises silty/sandy/gravelly clay or sandy/clayey silt between approximately 6.5 m to 11 m thick. Based on the consistency of the material and the underlying geology, the material is inferred to be residual of the underlying shale. Based on the geological map, there are no known faults that intersect the site.
Acid sulfate soils	Acid sulphate soils mapping in the study area indicates that the probability of presence of acid sulphate soils is extremely low thus not expected to be present within the study area.

4 Site history

4.1 Potentially contaminated land

Arup engaged Lotsearch Pty Ltd (Lotsearch) to complete a search of publicly available databases of potentially contaminated sites that are reported by the NSW Environment Protection Authority (EPA) and various Commonwealth departments. The Lotsearch report (Appendix A) provides information on registered sites that are located within the Subject Site boundary, or are within the buffer area, which for most datasets was 1,000 m from the Subject Site unless noted otherwise. A summary of the search results is provided in Table 5 below.

Table 5: Registered sites with potentially contaminated land

Dataset	Findings
List of NSW contaminated sites notified to EPA	There were no sites notified to EPA within 1,000 m of the site.
Contaminated Land: Records of Notice	There were no sites notified to EPA within 1,000 m of the site.
Former Gasworks	There were no sites notified to EPA within 1,000 m of the site.
National Waste Management Site Database	There were no sites notified to EPA within 1,000 m of the site.
National Liquid Fuel Facilities	There were no sites notified to EPA within 1,000 m of the site.
EPA PFAS Investigation Program	There were no sites notified to EPA within 2,000 m of the site.
Defence PFAS Investigation Program	There were no sites notified to EPA within 2,000 m of the site.
Defence PFAS Management Program	There were no sites notified to EPA within 2,000 m of the site.
Air services Australia National PFAS Management Program	There were no sites notified to EPA within 2,000 m of the site.
Defence 3 Year Regional Contamination Investigation Program	There were no sites notified to EPA within 2,000 m of the site.
EPA Other Sites with Contamination Issues	There were no sites notified to EPA within 1,000 m of the site.
Licensed Activities under the POEO Act 1997	There were no sites notified to EPA within 1,000 m of the site.
Delicensed Activities still regulated by the EPA	There were no sites notified to EPA within 1,000 m of the site.
Former Licensed Activities under the POEO Act 1997, now revoked or surrendered	4653, Luhrmann Environment Management Pty Ltd, Waterways throughout NSW, surrendered, 06/09/2000, Other Activities/Non-Scheduled Activity – Application of Herbicides

	4838, Robert Orchard, Various Waterways throughout New South Wales – Sydney NSW 2000, surrendered, 07/09/2000, Other Activities/Non-Scheduled Activity – Application of Herbicides
	6630, Sydney Weed & Pest Management Pty Ltd, Waterways throughout NSW – Prospect, NSW, 2148, surrendered, 09/11/2000, Other Activities/Non-Scheduled Activity – Application of Herbicides
Dry Cleaners, Motor Garages & Service Stations 1948-1993	There were no sites notified to EPA within 500 m of the site.

4.2 Previous environmental investigations

As part of the site history review, Arup reviewed the following reports relating to the Subject Site and a summary of each report is provided in Table 6:

- JBS&G, 2019a, *Environmental Site Assessment, 657-703,707-711, 707A, 713-755 & 757-769 Mamre Road, Kemps Creek, NSW 2178*, JBS&G Australia Pty Ltd, 27 February 2019
- JBS&G, 2019b, *Site Salinity Assessment, 657-703,707-711, 707A, 713-755 & 757-769 Mamre Road, Kemps Creek, NSW 2178,* JBS&G Australia Pty Ltd, 27 February 2019

Table 6: Summary of investigations by JBS&G for contamination and soil salinity

Report Item	Summary
JBS&G, 2019a, Environmental Site Assessment, 657-703,707-711, 707A, 713-755 & 757-769 Mamre Road, Kemps Creek, NSW 2178, JBS&G Australia Pty Ltd, 27 February 2019	
Investigation details	JBS&G was engaged by Altis Property Group and Frasers Property (“the clients”) to complete an environmental site assessment (ESA) for the proposed Kemps Creek Warehouse, Logistics and Industrial Facilities Hub, including targeted investigations of identified areas of environmental concern (AECs). The ESA related to a number of land parcels comprising a total area of 116.3 ha, including the Subject Site and surrounding areas.
Report date	27 February 2019
Objective	The objective of the ESA was to characterise potential site contamination such that the suitability of the site for the proposed land uses can be determined, and to make recommendations regarding appropriate management of impacts if identified.
Scope of works	• Desktop review of site history and environmental setting • Detailed site inspection to identify other potential AECs • Field investigation program comprising sampling and analysis of soil and groundwater at 48 intrusive investigation locations Comparison of collected data against regulator published / endorsed investigation criteria to facilitate an assessment of land use suitability.

Report Item	Summary
Results	• Desktop assessment and detailed inspection of the site has not identified the potential for gross and/or widespread contamination to exist at the site. Potential for localised impacts was identified, consistent with the historical use of the site for a combination of commercial (Mamre Produce) agricultural, recreational and rural residential purposes • Potential contamination impacts were assessed by advancement of 48 intrusive investigation locations, field screening of site media and subsequent laboratory analysis for COPCs. No COPCs were identified within site media samples analysed which exceeded relevant site screening assessment criteria for commercial/industrial land use site suitability • No background contamination, chemical mixtures or the potential risk of migration of contaminants from the site has been identified • No trigger for further assessment of aesthetics was identified during the site investigation • A fragment of bonded asbestos containing material (ACM) was identified in a single location (TP01) located to the north of the Subject Site. With respect to the concentration of ACM within the broader soil matrix, this occurrence does not comprise an exceedance of site suitability criteria, but will require management during site development under the Work Health and Safety Regulation 2017. • Three groundwater monitoring wells were installed to intercept perched water within unconsolidated site soils, overlying the weathered shale bedrock. The standing water level within the wells ranged between 2.677 metres below top of casing (mbTOC) and 4.435 mbTOC. Groundwater was inferred to be flowing towards the west.
Conclusions	• From a contamination perspective, the property is considered suitable for the proposed development and no potential risks to future receptors were identified • Management controls as part of the Construction Environmental Management Plan (CEMP), including an unexpected finds protocol, are required for earthworks and development stages.
JBS&G, 2019b, Site Salinity Assessment, 657-703,707-711, 707A, 713-755 & 757-769 Mamre Road, Kemps Creek, NSW 2178, JBS&G Australia Pty Ltd, 27 February 2019	
Investigation details	JBS&G was engaged by the clients to complete a site salinity assessment (SSA) and an acid sulfate soils (ASS) assessment for the proposed Kemps Creek Warehouse, Logistics and Industrial Facilities Hub. The ESA related to a number of land parcels comprising a total area of 116.3 ha, including the Subject Site and surrounding areas.
Report date	27 February 2019
Objectives	The objective of the SSA is to characterise potential salinity and ASS conditions at the site such that the suitability of the site for the proposed land uses can be determined, and to make recommendations regarding appropriate management of the identified conditions as required.
Scope of works	• Desktop review of site history and environmental setting • Detailed site inspection to identify indicators of potential salinity and acid sulfate soil (ASS) conditions

Report Item	Summary
	• Field investigation program comprising sampling and analysis of soil and groundwater samples for a range of physiochemical indicator characteristics • Comparison of collected data against appropriate guideline and Australian Standard criteria to facilitate an assessment of salinity and ASS potential Make recommendations regarding appropriate management of impacts.
Results	• No potential for the presence of ASS was identified in the desktop assessment undertaken for this DSI. During site sampling, no indicators of ASS were observed within sampled material. On this basis, no management for the potential presence of ASS is required during or following redevelopment of the site Desktop assessment identified the potential for regional salinity and sodicity characteristics to exist within natural soil strata at the site. Soils on upper and lower slopes are considered to be moderately and slightly saline respectively, with elevated salinity present in the deeper (>1 m below ground surface) soil profiles. Site soils present within all site landforms are considered to be ‘highly sodic’.
Conclusion	• Management controls as part of the CEMP are required for earthworks and development stages • Soil and water management controls as part of the CEMP are required to address the identified soil conditions • An imported materials management protocol should be implemented to ensure only suitable materials are imported onto the site (i.e. non-saline, non-sodic soil/fill material) Development design teams, (including civil works, structural/building/hydraulics engineering team and landscape designers) are required to consider the saline nature of the soils and shallow groundwater seepage system and to ensure appropriate precautions are considered for materials to be in contact with the saline soils.

4.3 Historical aerial imagery

Table 7: Historical aerial imagery review

Year	Image details[1]	On-site	Surrounding area
1947	Black and white Historical aerial imagery	The Subject Site appeared predominantly grass covered and almost entirely cleared of trees. The land within the Subject Site appeared predominantly agricultural in nature. Surface patterns suggested different land uses	The surrounding area appeared predominantly agricultural in nature and almost entirely cleared of trees. Surface patterns suggested different land uses were present, presumed to be grazing and cropping.

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[1] Historical aerial photography provided in Appendix A

		were present, presumed to be grazing and cropping. In the north of the Subject Site a line of trees was present.	Several unsealed road tracks were present in the surrounding area, with one running east-west, and two running north-south which corresponds to present-day locations of these paths/subdivisions. Mamre Road was present to the east and South Creek to the west of the Subject Site. The unnamed tributary to South Creek was present to the south. Small clusters of trees and shrubs were present to the north, west and south-west of the Subject Site. Individual stands of trees were present to the south and south-east of the Subject Site.
1955	Black and white Historical aerial imagery	The Subject Site appeared predominately grass covered and agricultural in nature. Different land uses were present however the boundary between cropping and grazing land uses has shifted east, with less land used for cropping as compared to the 1947 aerial photograph. The rest of the Subject Site was generally similar to the 1947 aerial photograph.	A dam was constructed to the south of the Subject Site in the unnamed tributary. Vegetation to the north of the Subject Site appeared more abundant and dense. Small clusters of trees and shrubs to the west and south-west and individual trees to the south and south-east appeared similar to the 1947 aerial photograph. The east-west and the two north-south road tracks have disappeared, presumed to be overgrown by grass due to lack of use.
1965	Black and white Historical aerial imagery	No significant changes were observed.	Vegetation to the north appeared less dense compared to the 1955 aerial photograph. Vegetation to the north-west appeared to have been cleared. The remaining area was generally similar to the 1955 aerial photograph.
1978	Black and white Historical aerial imagery	The boundary between cropping and grazing has shifted west, with more land used for cropping compared to the 1970 aerial photograph.	Vegetation to the north-east, west, south and south-east had been extensively cleared for agricultural use. Some vegetation to the north of the Subject Site was present. The dam to the south of the Subject Site was filled in and converted to cropping and grazing land. A small dam appeared to the north-east of the Subject Site.

1986	Colour Historical aerial imagery	The Subject Site appeared predominantly grass covered and agricultural in nature. The boundary between cropping and grazing land uses had shifted east with the grazing as the predominant land use for the whole Subject Site.	Two large structures to the east of the Subject Site appeared, presumed to be a residential dwelling and a shed. Two lines of vegetation plantings occurred around the east and south of these structures. To the west and south of these structures, land appeared to be used for market gardens. The remaining area was generally similar to the 1978 aerial photograph.
1994	Colour Historical aerial imagery	The Subject Site was predominantly occupied by market gardens. A small dam was present in the north of the Subject Site. Unsealed road tracks were present, running east-west and north-south.	To the east of the Subject Site, a second shed and a structure presumed to be a swimming pool was present. Additional structures presumed to be greenhouses or similar were present. Land to the south of the Subject Site also appear to be occupied by market gardens with several road tracks present. Additional residential structures to the south-east were observed. Some vegetation to the north had been cleared and the land used for cropping. Land to the east of Mamre Road was also occupied by market gardens and a large dam was constructed.
2009	Colour Historical aerial imagery	The land was predominantly pastoral in nature, presumed to be used for grazing.	To the east of the Subject Site, greenhouse structures had been dismantled and the residential dwelling appeared larger, presumed to have undergone rebuilding or home extension works. A dam to the west of the structures had been constructed. Market gardens to the south had disappeared and the land appeared covered in grass and pastoral in nature. Land degradation was seen to the south west of the Subject Site as exposed patches of soil/sand. Vegetation to the north-east and north-west appeared to be regrowing. Land to the east of Mamre Road appeared pastoral in nature and covered in grass.

2020	Colour Historical aerial imagery	The land was predominantly covered in grass and pastoral in nature, presumed to be used for grazing. The dam to the north had been filled in. Additional structures appeared in the south-west and south-east of the Subject Site.	To the east, the residential structure, pool and first shed had been demolished while the second shed constructed later was still present. A bitumen/gravel carpark or similar structure had been constructed south of the shed. Land to the south of the Subject Site appeared generally similar to the 2009 aerial photograph with degraded areas to the south-east showing improvement. Residential structures to the south-east show minor additions and demolitions. The rest of the land appear generally similar to the 2009 aerial photograph.

4.4 Site history summary

A site history summary has been compiled in Table 8, based on the information reviewed during the desktop study, including EPA registers, historical contaminated land assessment reports and historical aerial imagery.

Table 8: Site history summary

Year	Description	Reference
1940s-1950s	The Subject Site was predominantly grass covered and agricultural in nature, with land used to cultivate crops and as agricultural feeding land. Several unsealed road tracks were present in the surrounding area, with one running east-west, and two running north-south which corresponds to present-day locations of these paths/subdivisions. Mamre Road was present to the east and South Creek to the west of the Subject Site. The unnamed tributary to South Creek was present to the south. In the later 1950s, a large dam was constructed to the south of the Subject Site in the unnamed tributary.	Lotsearch (2021) LS017278 JBS&G (2019a)
1960s-1970s	No significant land use changes were observed on the Subject Site however extensive vegetation clearing occurred in the surrounding areas. A golf course was present to the northwest of the Subject Site in the 1960s. By the 1970s, the large dam to the south had been in-filled and converted to cropping and grazing land. A small dam appeared to the north-east of the Subject Site.	Lotsearch (2021) LS017278 JBS&G (2019a)
1980s-1990s	The Subject Site remained agricultural in nature and used for cultivating crops and grazing land until the early 1990s where it was predominantly occupied by market gardens. A small dam was present in the north of the Subject Site. Residential developments adjacent to the eastern part of the Subject Site were first established in the 1980s comprising of one residential dwelling and a shed. This was expanded in the	Lotsearch (2021) LS017278 JBS&G (2019a)

	1990s with a second shed and additional greenhouse/shading structures.	
2000s-present	By the late 2000s, the land within and surrounding the Subject Site had returned to being predominantly grass covered and presumably used for grazing. A dam adjacent to the east of the Subject Site had been constructed. By 2020, previous small dams had been in-filled, some additional farming structures appeared in the south-west and south-east of the Subject Site and the residential structures adjacent to the east of the Subject Site had been demolished.	Lotsearch (2021) LS017278 JBS&G (2019a)

5 Conceptual site model

The ASC NEPM (2013) describes the conceptual site model (CSM) as a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all contaminated land assessments and provides the framework for identifying site contamination and how potential receptors may be exposed to contamination either in the present or the future.

5.1 Potential sources of contamination and chemicals of potential concern

A desktop review of historical information was conducted and a review of previous investigations was analysed. Several areas of environmental concern (AECs) were identified and their associated COPCs are outlined in Table 9:.

Table 9: Areas of environmental concern and associated contaminants of potential concern

Areas of Environmental Concern (AEC)	Media	Chemicals of Potential Concern
Areas of imported fill material including an in-filled dam Fill material of unknown quality may have been imported to the Subject Site for infilling of dams	Soils	• Heavy metals • Polycyclic aromatic hydrocarbons (PAHs) • Hydrocarbons including benzene, toluene, ethylbenzene and xylenes (BTEX) • Organochlorine pesticides (OCPs) • Polychlorinated biphenyls (PCBs) • Phenols • Asbestos.
Existing and historical building footprints Buildings constructed prior to 1990s may contain asbestos containing materials. Uncontrolled demolition of buildings and structures may have impacted soils. Building and demolition waste was identified within the Subject Site (JBS&G, 2019a).	Soils	• Heavy metals • Asbestos.
Areas of intensive agricultural land use The majority of the Subject Site was historically used for cropping which may have included the	Soils and groundwater	• Pesticides • Herbicides • Fertilisers

application of fertilisers and pesticides. A cattle yard and fertiliser storage area was identified to be within the Subject Site (JBS&G, 2019a)		• PFAS (as an adjuvant or active ingredient in fertilisers and pesticides).

5.2 Potentially affected media

Environmental media potentially affected by contamination are summarised below:

- Soils – contaminants introduced by fill material or absorbed to fill material, natural soils and dust particles
- Groundwater – rainwater leaching of contaminants from soils into underlying groundwater and/or contaminated groundwater migrating into the study area
- Surface water – contaminated soil runoff into waterways during rainfall events
- Sediments – contaminated soil particles settling out of surface waters, or precipitation from the water column
- Air – volatilisation of contaminants as gases to indoor and outdoor air.

5.3 Potential receptors

Potential receptors relevant to the proposed future use of the Subject Site as a data centre include:

- Commercial workers and visitors
- Construction workers/intrusive maintenance workers – during construction and post-construction maintenance works
- Building materials, e.g. underground steel and concrete pipes, piles and footings
- Terrestrial ecosystems, e.g. trees.

Off-site receptors include:

- Residents
- Commercial workers
- Intrusive maintenance workers, e.g. underground utility maintenance
- Users of groundwater, e.g. groundwater extracted for domestic and agricultural use
- Recreational users of surface water, e.g. South Creek

- Terrestrial ecosystems
- Aquatic ecosystems including South Creek.

5.4 Potential migration and exposure pathways

5.4.1 Human health

Human health receptors may be exposed to impacted environmental media through one of the following pathways:

- Incidental ingestion – ingestion of soils, extracted groundwater, surface water
- Inhalation of dust – during construction and operational stages; and intrusive maintenance works
- Direct contact – shallow soil, shallow groundwater in excavations, extracted groundwater, surface water

Generally, direct (dermal) contact with and ingestion of soils is limited to the top 0.5 m, although construction or intrusive workers may disturb and be exposed to deeper soils. Groundwater may be accessible when extracted for uses such as domestic (non-potable), agricultural, or other purposes.

5.4.2 Ecological

Ecological receptors may be exposed to impacted environmental media through either:

- Direct contact – uptake from soils, sediments, surface water, irrigated groundwater
- Indirect contact – some COPCs including PFAS may bioaccumulate via the food web.

Habitat areas for terrestrial receptors (the root zone, burrowing animals, etc.) are generally assumed to extend up to 2 m depth.

5.4.3 Buildings and structures

Buried infrastructure including underground steel and concrete structures, piling and piling caps, footings, pipes and conduits may be exposed to impacted environmental media by direct contact with soil and groundwater.

5.5 Data gaps

Data gap identification and uncertainty assessment are key activities in developing and refining a CSM during the site assessment process. This initial CSM has been developed based only on the information obtained from the desktop study and the following data gaps were identified:

- Recent site investigations undertaken by JBS&G (2019a, 2019b) focused on land to the north of the Subject Site, with a limited number of sampling points within the central and northern portion of the Subject Site
- The JBS&G site investigations did not include an assessment of the following:
    - Potential soil contamination related to the building and demolition waste identified in the south western and eastern portions of the Subject Site
    - Potential soil contamination related to the cattle yard and fertiliser storage area in the south eastern portion of the Subject Site
    - Potential PFAS in soils which may be present due to historical application of fertilisers and pesticides to cropping areas within the Subject Site

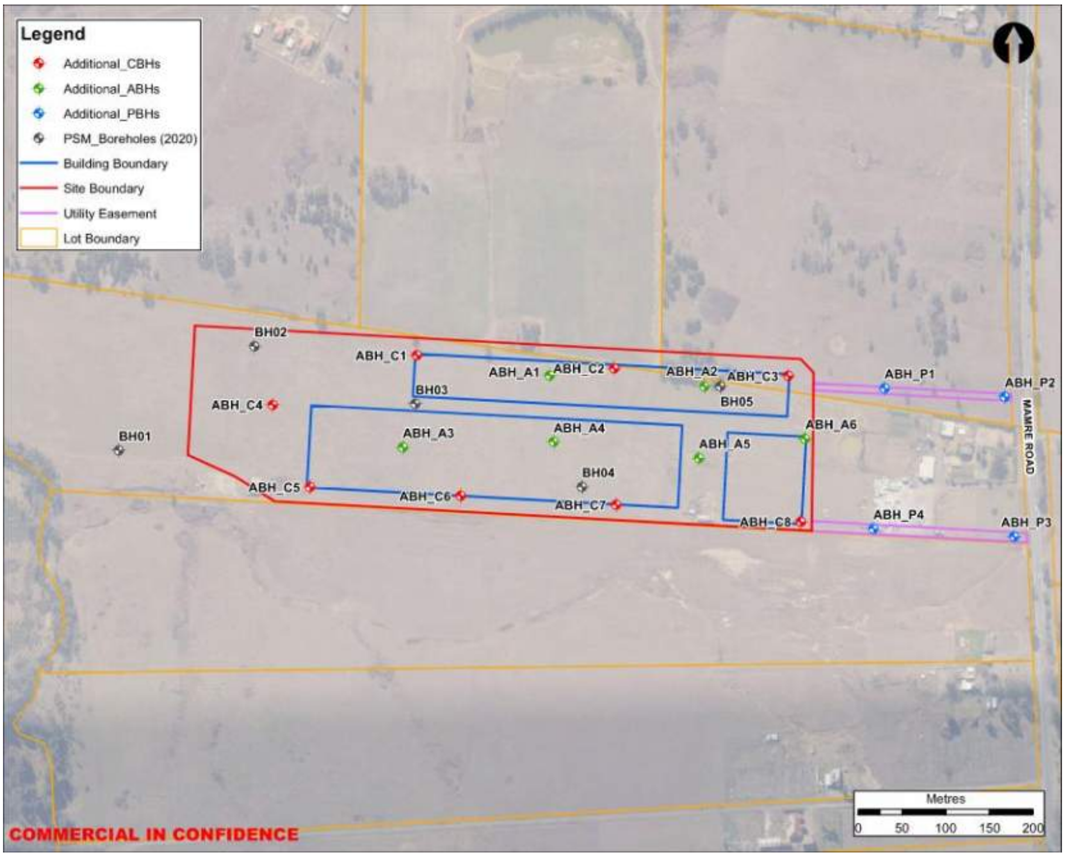
The iterative development and refinement of the CSM is the most effective way to reduce uncertainty in the nature and extent of contamination within the Subject Site. Refinement of the CSM can be achieved by undertaking further site investigation and confirming the presence or absence of contamination.

6 Soil investigation methodology

6.1 Investigation locations

The soil investigation comprised drilling and sampling of soils from 16 of 18 boreholes locations. The borehole locations are shown on Figure 2.

Figure 2: Plan showing boreholes locations



6.2 Fieldwork methodology

The fieldwork methodology implemented for the soil investigation is summarised in Table 10.

Table 10: Soil investigation fieldwork methodology

Activity/Item	Details
Date of field investigation	5 to 12 January 2021
Underground and above ground utility clearance	Total Surveying Solutions Pty Ltd (TSS) was engaged to identify underground services prior to intrusive works. Dial before you dig plans were reviewed on-site with TSS. No utilities/services were detected at all of the borehole locations.
Borehole drilling	BG Drilling was engaged for the borehole drilling work.

Activity/Item	Details
	A total of 18 boreholes were drilled (through auger) during the site investigation. Rock coring (HQ size) were carried out in eight out of the 18 boreholes with rock samples collected and placed into core trays for storage and subsequent testing. Soil samples from all the holes were also collected for geotechnical testing. The non-cored boreholes can be further categorized into shallow boreholes and deep boreholes. The shallow boreholes were terminated at 3 m depth while the deep boreholes termination depth ranges from 9 m to 18 m. The cored boreholes were terminated at a depth of 18 m.
Standpipe groundwater borehole installation	Four nos. of standpipes were installed in the boreholes to facilitate groundwater observation post drilling. two nos. of the standpipes were installed to a depth of 8 m and 9 m (target stratum: soil), while another two were installed to a depth of 18 m (target stratum: rock). Monitored groundwater levels during the period of observation (7 January to 12 January 2021) range from 1.3 to 4.9 mBGL (for standpipes with target stratum in rock) and between 1.3 to 4.5mBGL (for standpipes with target stratum in soil). In the course of drilling works, groundwater strikes were observed to be between 2 to 4.2 mBGL.
Soil logging	Soil and rock type classifications and descriptions were based on Australian Standard 1726 – 2017. The borelogs are provided in Appendix B
Soil sampling	Soil samples were collected for contamination testing at regular intervals, such as 0 m, 0.5 m, 1.0 m and 1.5 m. Soil samples were obtained from the standard penetration test tubes at all the intervals except for the 0 m interval where the samples were collected off the auger drill head. In addition to AS1726 – 2017, AS1289.1.3.1 – 2015 and AS1289.6.3.1 – 2004, the sampling methodology to collect samples for contamination testing was in general accordance with AS AS4482.1 Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.
Field QA/QC sampling	Field QA/QC samples were collected where possible at the following frequencies: • Intra-laboratory duplicates collected for every 20 samples • Rinsate blank samples collected at a minimum rate of one per piece of equipment per day.
Sample preservation and integrity	All samples were collected using a new pair of disposable nitrile gloves, placed in clean, laboratory-supplied containers. Samples were stored on ice, in a cooler box whilst on-site and in transit to the laboratory under chain of custody (COC) protocols.
Soil sample screening for volatile organic compounds (VOCs)	Soil samples were field screened for VOCs by placing soil into a snap-lock bag and measuring the headspace concentration using a photo ionisation detector (PID). PID measurements are shown on the borelogs provided in Appendix B.
Decontamination	Equipment used to collect samples, including hand auger and trowel were decontaminated between use with a PFAS-free solution and rinsed with potable water.

Activity/Item	Details
	Equipment rinsate samples were collected from the sampling equipment at a rate of one per day (when in use) to provide an indication of the effectiveness of equipment decontamination.

6.3 Localised geological profile

A description of the site geology and soil landscape has been provided in the overarching geotechnical assessment report (SYD05-06-07_Y-R-0003). For convenience of referencing, the overlay of the Subject Site over the geological map (New South Wales Seamless Geology dataset) is reproduced in Figure 3. We note that the Lotsearch report has used a different geological map (1:100 000 Penrith Geological Sheet [2]) and thus has indicated a different underlying geology of the Subject Site. However, it is worth noting that the geological boundary shown on geological maps are typically only an approximate. Further description of the likely sub-surface ground based on intrusive investigations is discussed below.

At the time of writing, the factual report for the recent site investigation was being prepared. Hence the data adopted herein to produce the generalized geological profile (Table 11) were compiled from preliminary borehole logs of the recent investigation and report of the previous site investigation undertaken within the Subject Site. From the field observation of the recent site investigation, except for the topsoil, it can be noted that the composition and properties of the soil layer was likely residual of the underlying bedrock.

Figure 3: Overlay of site on the New South Wales Seamless Geology dataset geological map

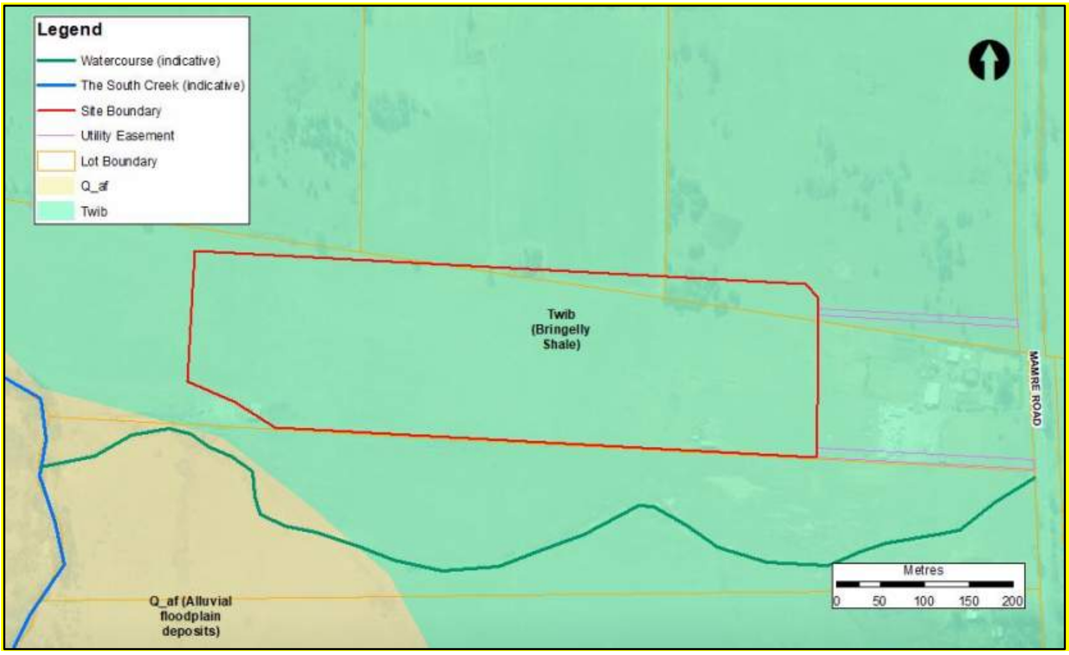


Table 11: Generalised geological profile within the Subject Site

Depth	Description
0.0 – 0.3 m	TOPSOIL: Silty clay
0.3 m – 11.1 m	NATURAL: Thick residual Bringelly Shale: sandy/silty/gravelly clay or sandy/clayey silt with intermediate clayey/silty sand
6.5 m – 50 m	NATURAL: Extremely weathered to fresh Bringelly Shale (predominantly siltstone/sandstone)

The following field observations were noted during the soil investigation:

- All samples were field screened for VOC by measuring headspace of soil in a snap lock bag using a PID. Field screening did not indicate the presence of VOCs in soils with all sample measurements below 1 part per million.
- No contaminative odours or staining were observed.
- The soil profile was dry in all boreholes up to the depth of contamination investigation.

Potential asbestos containing materials (ACM) (e.g. bonded cement sheets) were not observed in the boreholes.

7 Soil investigation results

7.1 Laboratory analysis

Primary soil samples were sent to ALS Environmental (ALS) which is accredited by the National Association of Testing Authorities (NATA).

For a general representation of the Subject Site, a minimum of one sample per borehole was selected for laboratory analysis of a range of COPCs, including:

- PFAS (28 analytes)
- Heavy metals – NEPM Suite (arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, vanadium and zinc)
- Organochlorine and organophosphorus pesticides (OCPs/OPPs)
- Polychlorinated biphenyls (PCBs)
- Phenoxyacetic acid herbicides
- Major cations (calcium, magnesium, sodium and potassium)
- Corrosion indicators (pH, chloride and sulphate) (selected samples only)
- Polycyclic aromatic hydrocarbons (PAH) and phenols (samples of fill only)

The depth of the samples selected for testing was varied (between 0 m to 1.5 m) to give an inclusive representation of the Subject Site.

7.2 Regulatory context

The investigation was undertaken with consideration of the relevant regulations, policies and guidelines document in Table 12.

Table 12: Overarching policies and regulatory guidelines related to this report

Policy
Draft Mamre Road Precinct Development Control Plan (DCP)
Managing Land Contamination Planning Guidelines SEPP 55 - Remediation of Land (Department of Urban Affairs and Planning and EPA 1998) (Planning Guidelines)
NSW EPA 2017. Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 3rd Edition
NSW EPA 2015. Contaminated Sites: Guidelines on Duty to Report Contamination under Land Management Act 1997
NSW EPA 2020. Consultants reporting on contaminated land – Contaminated land guidelines
NSW EPA 2014. Waste Classification Guidelines Part 1 - Classifying waste

NSW EPA 2016. Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste
National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended in 2013 (ASC NEPM)
PFAS National Environmental Management Plan 2020
State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55)

7.2.1 Site assessment criteria

The Subject Site will form part of the new Kemps Creek Warehouse, Logistics and Industrial Facilities Hub, thus the soil investigation and results were compared against the future land-use of the Subject Site as commercial/industrial. As per the decision process for assessing urban sites in general accordance with Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 3rd Edition (EPA 2017), Table 13 lists the environmental values and the relevant investigation and screening levels adopted.

Table 13: Soil investigation and screening levels adopted

Environmental value	Investigation and screening levels
Maintenance of ecosystems	• NEPM (2013) Generic and Site-Specific Aged Ecological Investigation Levels (EILs) for Commercial/Industrial • NEPM (2013) Ecological Screening Levels (ESLs) for Commercial/Industrial, coarse soils • PFAS NEMP (2020) Ecological direct exposure.
Human Health	• NEPM (2013) Health Investigation Levels (HILs) for Commercial/Industrial • NEPM (2013) Health Screening Levels (HSLs) for Commercial/Industrial • CRC Care (2011) Table B4 Direct Contact Commercial/Industrial and Intrusive Maintenance Workers • PFAS NEMP (2020) HIL-D Industrial/Commercial.
Buildings & structures	• AS 2159 (2009) Table 6.4.2(C) Concrete piles in soil.
Aesthetics	• Contamination must not cause the land to be offensive to senses of human beings.
Waste Disposal	• NSW (2014) General Soil Waste • NSW (2014) Restricted Solid Waste SCC2 • PFAS NEMP (2020) Landfill Acceptance Criteria (Double/Clay Single/Unlined Landfill).

7.3 Data quality assessment

An assessment of data quality was undertaken, including review of field and laboratory quality control data to determine the suitability of the data for use in the assessment of site contamination. A summary of the data quality assessment is provided in Appendix C. Overall, the data was considered to be valid and of sufficient quality for the purpose and objectives of this investigation.

7.4 Soil analytical results

A total of 16 primary samples were tested for the following COPC:

- Heavy metals
- PFAS
- Organochlorine and organophosphorus pesticides (OCPs and OPPs)
- Phenoxyacetic acid herbicides
- Polychlorinated biphenyls (PCBs)
- Soluble major cations (calcium, magnesium, sodium, potassium)
- Four samples of fill were analysed for polynuclear aromatic hydrocarbons (PAHs) and phenolic compounds
- Three samples of natural soil were analysed for concrete and steel corrosion indicators (pH, soluble sulphate, soluble chloride)

Soil analytical results were compared with human health and ecological investigation screening levels relevant to commercial / industrial land-use, and guidelines applicable for the reuse and/or disposal of soils. The results are presented in Tables D1 in Appendix D.

The results are discussed in the following sections and the laboratory certificates and COC documentation is provided in Appendix E.

7.4.1 Environmental values

Concentrations of COPCs, where detected, did not exceed the relevant human health and environmental assessment criteria. A summary of the results in is provided below:

- Trace concentrations of perfluorooctane sulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) were detected in four samples (ABH-A10 1.0m, ABH-C2 0.5m, ABH-P3 0.5m and ABH-P4 0m). These concentrations were orders of magnitude below the relevant screening levels
- Concentrations of heavy metals were reported to be either below the laboratory limit of reporting (LOR) or below the relevant investigation and screening levels
- Concentrations of PAHs, phenols, OCPs, OPPs, PCBs and phenoxyacetic acid herbicides in all samples were reported to be below the laboratory LOR

7.4.2 Waste classification criteria

The classification of wastes must be undertaken in accordance with the EPA Waste Classification Guidelines (2014). The soil analytical results have been compared with criteria relevant to the reuse and/or disposal of soils. However, a waste classification cannot be determined as the limited sampling and analysis undertaken in this investigation does not meet the requirements outlined in Waste Classification Guidelines – Part 1: Classification of waste (EPA, 2014).

A summary of the results is provided below:

- Concentrations of COPCs, where detected, did not exceed the maximum values of specific contaminant concentration (SCC) for 'General Solid Waste'
- Trace concentrations of PFOS and PFOA were detected in four samples (ABH-A10 1.0m, ABH-C2 0.5m, ABH-P3 0.5m and ABH-P4 0m). The concentrations were orders of magnitude below the SCC for 'General Solid Waste' and PFAS NEMP (2020) Landfill Disposal Criteria

8 Conclusions and recommendations

8.1 Conclusions

The desktop review identified a number of potential sources of contamination relating to the current and historical use of land within and adjacent to the Subject Site, including:

- Infilling of dams with fill material of unknown quality
- Demolition of buildings and structures constructed prior to 1990s, including building and demolition waste
- Agricultural/farming land use, including cattle yard and fertiliser storage area

The COPC relevant to the sources of contamination include asbestos, heavy metals, PAHs, phenols, PCBs, TRHs/BTEX, OCC/OPPs, herbicides and fertilisers. These are likely to occur in shallow, surficial soils within localised areas of historical construction, demolition and agricultural use.

Further, the JBS&G (2019b) Site Salinity Assessment identified the potential for regional salinity and sodicity characteristics to exist within natural soils at the Subject Site and surrounding areas. Soils on upper and lower slopes were considered to be moderately and slightly saline respectively, with elevated salinity present in the deeper (>1 m below ground surface) soil profiles. Soils present within all site landforms were reported to be ‘highly sodic’. Based on the JBS&G (2019b) report, the potential for acid sulfate soils was low and did not require further management was required during site development.

The findings from the limited soil investigation comprising sampling and analysis of shallow soils from 16 borehole locations, indicated the following:

- The generalised soil profile at the Subject Site comprised silty clay topsoil overlying residual Bringelly Shale (sandy/silty/gravelly clay or sandy/clayey silt with intermediate clayey/silty sand)
- Potential asbestos containing materials (e.g. bonded cement sheets) were not observed in the boreholes
- Trace concentrations of PFOS and PFOA were detected in four samples (ABH-A10 1.0m, ABH-C2 0.5m, ABH-P3 0.5m and ABH-P4 0m). These concentrations were orders of magnitude below the relevant human health and environmental screening levels and below the SCC for ‘General Solid Waste’ and PFAS NEMP (2020) Landfill Disposal Criteria
- Concentrations of heavy metals were reported to be either below the laboratory LOR or below the relevant human health and environmental screening levels and below the SCC for ‘General Solid Waste’

- Concentrations of PAHs, phenols, OCPs, OPPs, PCBs and phenoxyacetic acid herbicides in all samples were reported to be below the laboratory LOR
- Concentrations of COPCs, where detected, did not exceed the maximum values of specific contaminant concentration (SCC) for 'General Solid Waste'

An assessment of groundwater quality was beyond the scope of the investigation; however groundwater levels were identified to range from 1.3 to 4.9 mBGL in the four standpipes installed at the Subject Site.

8.2 Recommendations

Further sampling and analysis of soils is recommended in areas of environmental concern where potential sources of contamination have not been investigated, including:

- Potential soil contamination related to the building and demolition waste identified in the south western and eastern portions of the Subject Site
- Potential soil contamination related to the cattle yard and fertiliser storage area in the south eastern portion of the Subject Site
- Footprints and immediate surrounds of existing and historical buildings and structures for potential hazardous materials, including asbestos containing materials

A CEMP is required for the redevelopment of the Subject Site. The CEMP should include, but not be limited to the following:

- Site salinity management plan to address sodicity and saline nature of soils
- Unexpected finds protocol to ensure adequate assessment and management of risks relating to potential contamination
- Spoil management plan to address to classification of spoil and wastes
- Imported fill material management plan to ensure the material is suitable for the future commercial/industrial use of the Subject Site

9 Limitations

The report has been prepared for and may be used and relied on solely by the Client for this Project only and for the purpose described in this report. Reliance on this report by other parties is subject to agreement in writing by Arup.

The services undertaken by Arup in connection with preparing this report were limited to those identified in Section 2.3 and are subject to the limitations set out in this section and throughout the report.

The findings and conclusions presented in this report are based on the proposed development as described in Section 1.1. The findings of this report will need to be reviewed and reassessed should these change.

Arup has based this report on the sources detailed within the report text and believes them to be reliable but cannot and does not guarantee the authenticity or reliability of third-party information. Reasonable skill and care has been exercised in preparation of this report in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in undertaking this contamination assessment, it is possible that ground conditions and contamination other than that potentially indicated by this report may exist at the site.

This report has been prepared based on current legislation, statutory requirements, planning policy and industry good practice prevalent at the time of writing. Any subsequent changes or new guidance may require the findings, conclusions and recommendations made in this report to be reassessed in the light of the circumstances.

This report does not present a survey or assessment of the location, condition or liabilities associated with hazardous materials in the building fabric such as (but not limited to) asbestos containing materials or lead.

Asbestos containing materials were not observed in the boreholes excavated during the soil investigation. Samples of fill material/topsoil at relevant locations were submitted for the analysis of asbestos fibres (presence/absence) and asbestos was not detected. It should be noted that the analysis of soil samples for asbestos in this investigation does not constitute an asbestos in soil contamination assessment as described in Schedule B2 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM). Due to the historical widespread use of asbestos in building materials and demolition practices that could spread asbestos contamination, asbestos contamination is likely to be encountered during Project construction works.

10 References

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13. Standards Australia, 2017. AS1726 – 2017, Geotechnical site investigations.

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15. Standards Australia. 2004, AS1289.6.3.1 – 2004, Soil strength and consolidation tests – Determination of the penetration resistance of a soil – Standard penetration test (SPT).

16. Standards Australia. 2005, AS4482.1 – 2005, Guide to the investigation and sampling of sites with potentially contaminated soil: Part 1: Non-volatile and semi-volatile compounds.
17. State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55)
18. Managing Land Contamination Planning Guidelines SEPP 55 - Remediation of Land (Department of Urban Affairs and Planning and EPA 1998) (Planning Guidelines)
19. NSW EPA 2017. Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 3rd Edition
20. NSW EPA 2015. Contaminated Sites: Guidelines on Duty to Report Contamination under Land Management Act 1997
21. NSW EPA 2020. Consultants reporting on contaminated land – Contaminated land guidelines
22. NSW EPA 2014. Waste Classification Guidelines Part 1 - Classifying waste
23. NSW EPA 2016. Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste
24. HEPA, 2020. PFAS National Environmental Management Plan Version 2.0, Heads of EPA Australia and New Zealand, 2020

Appendix A

Lotsearch Report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 12 Feb 2021 14:01:41

Reference: LS017278 EP

Address: 707-769 Mamre Road, Kemps Creek, NSW 2178

Dataset Listing

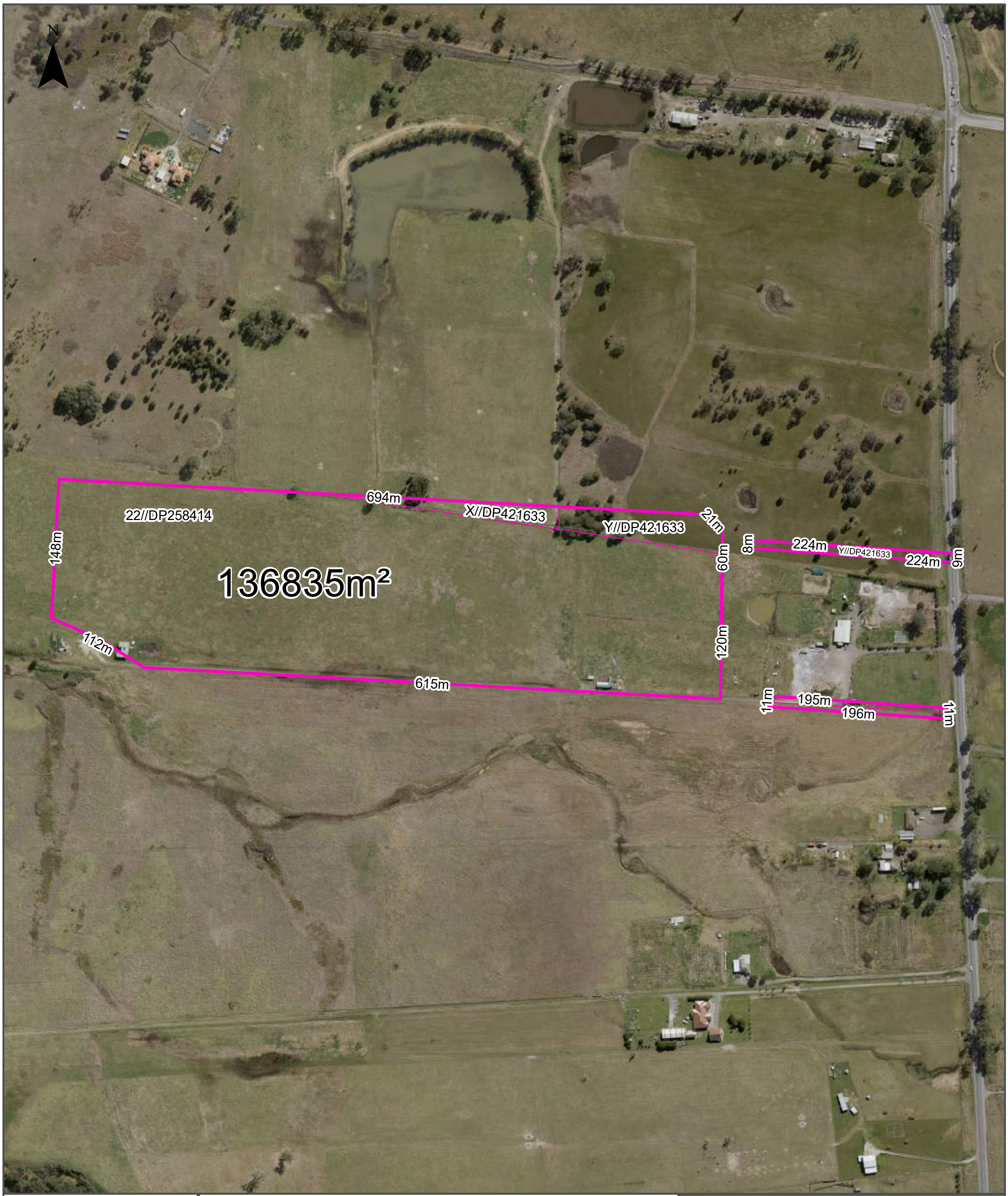
Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	13/11/2020	13/11/2020	Quarterly	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	14/01/2021	14/01/2021	Monthly	1000	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority	05/02/2021	05/02/2021	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	09/02/2021	11/10/2017	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	11/02/2021	07/03/2017	Quarterly	1000	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	12/11/2020	13/07/2012	Quarterly	1000	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	15/01/2021	23/11/2020	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	05/02/2021	05/02/2021	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	05/02/2021	05/02/2021	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	03/02/2021	03/02/2021	Monthly	2000	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	15/01/2021	15/01/2021	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	02/02/2021	13/12/2018	Annually	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	08/02/2021	08/02/2021	Monthly	1000	0	0	0
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	08/02/2021	08/02/2021	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	08/02/2021	08/02/2021	Monthly	1000	0	3	3
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500	0	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	0	0
Points of Interest	NSW Department of Finance, Services & Innovation	30/03/2020	30/03/2020	Quarterly	1000	0	0	8
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	30/03/2020	30/03/2020	Quarterly	1000	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	30/03/2020	30/03/2020	Quarterly	1000	0	0	1
Major Easements	NSW Department of Finance, Services & Innovation	30/03/2020	30/03/2020	Quarterly	1000	0	0	2
State Forest	Forestry Corporation of NSW	18/01/2018	18/01/2018	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	22/01/2021	11/12/2020	Annually	1000	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	26/10/2020	21/02/2018	Annually	1000	0	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000	0	0	8
Geological Units 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		None planned	1000	2	-	2
Geological Structures 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		None planned	1000	0	-	2
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000	1	1	1
Soil Landscapes of Central and Eastern NSW	NSW Department of Planning, Industry and Environment	14/10/2020	27/07/2020	Annually	1000	2	-	3
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	27/01/2021	03/07/2020	Monthly	500	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	2
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	1	1	1
Dryland Salinity Potential of Western Sydney	NSW Department of Planning, Industry and Environment	12/05/2017	01/01/2002	None planned	1000	1	1	3
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	30/03/2020	30/03/2020	Quarterly	1000	0	0	0
Current Mining Titles	NSW Department of Industry	05/02/2021	05/02/2021	Monthly	1000	0	0	0
Mining Title Applications	NSW Department of Industry	05/02/2021	05/02/2021	Monthly	1000	0	0	0
Historic Mining Titles	NSW Department of Industry	05/02/2021	05/02/2021	Monthly	1000	9	9	9
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	27/01/2021	07/12/2018	Monthly	1000	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	27/01/2021	22/01/2021	Monthly	1000	1	5	30
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	24/11/2020	20/11/2019	Quarterly	1000	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	24/11/2020	20/11/2019	Quarterly	1000	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	12/11/2020	02/07/2020	Quarterly	1000	0	0	0
Environmental Planning Instrument Heritage	NSW Department of Planning, Industry and Environment	27/01/2021	22/01/2021	Monthly	1000	0	0	0
Bush Fire Prone Land	NSW Rural Fire Service	05/02/2021	06/01/2021	Weekly	1000	2	2	3
Remnant Vegetation of the Cumberland Plain	NSW Office of Environment & Heritage	07/10/2014	04/08/2011	Unknown	1000	1	2	5
Ramsar Wetlands of Australia	Department of the Agriculture, Water and the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	1	1	4
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	1	1	6
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	08/02/2021	08/02/2021	Weekly	10000	-	-	-

Site Diagram

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

☐ Site Boundary

☐ Internal Parcel Boundaries

Total Area: 141113m^2

Total Perimeter: 2655m

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Scale:
0 25 50 100 150 200 250
Meters

Data Sources: Aerial Imagery © Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Contaminated Land

707-769 Mamre Road, Kemps Creek, NSW 2178

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist (m)	Direction
N/A	No records in buffer								

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

Contaminated Land

707-769 Mamre Road, Kemps Creek, NSW 2178

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority

Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit
http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority

Waste Management & Liquid Fuel Facilities

707-769 Mamre Road, Kemps Creek, NSW 2178

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Geoscience Australia

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist (m)	Direction
N/A	No records in buffer										

National Liquid Fuel Facilities Data Source: Geoscience Australia

PFAS Investigation & Management Programs

707-769 Mamre Road, Kemps Creek, NSW 2178

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Id	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority

Defence PFAS Investigation Program

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Management Program

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

707-769 Mamre Road, Kemps Creek, NSW 2178

Defence 3 Year Regional Contamination Investigation Program

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

EPA Other Sites with Contamination Issues

707-769 Mamre Road, Kemps Creek, NSW 2178

EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority

EPA Activities

707-769 Mamre Road, Kemps Creek, NSW 2178

Licensed Activities under the POEO Act 1997

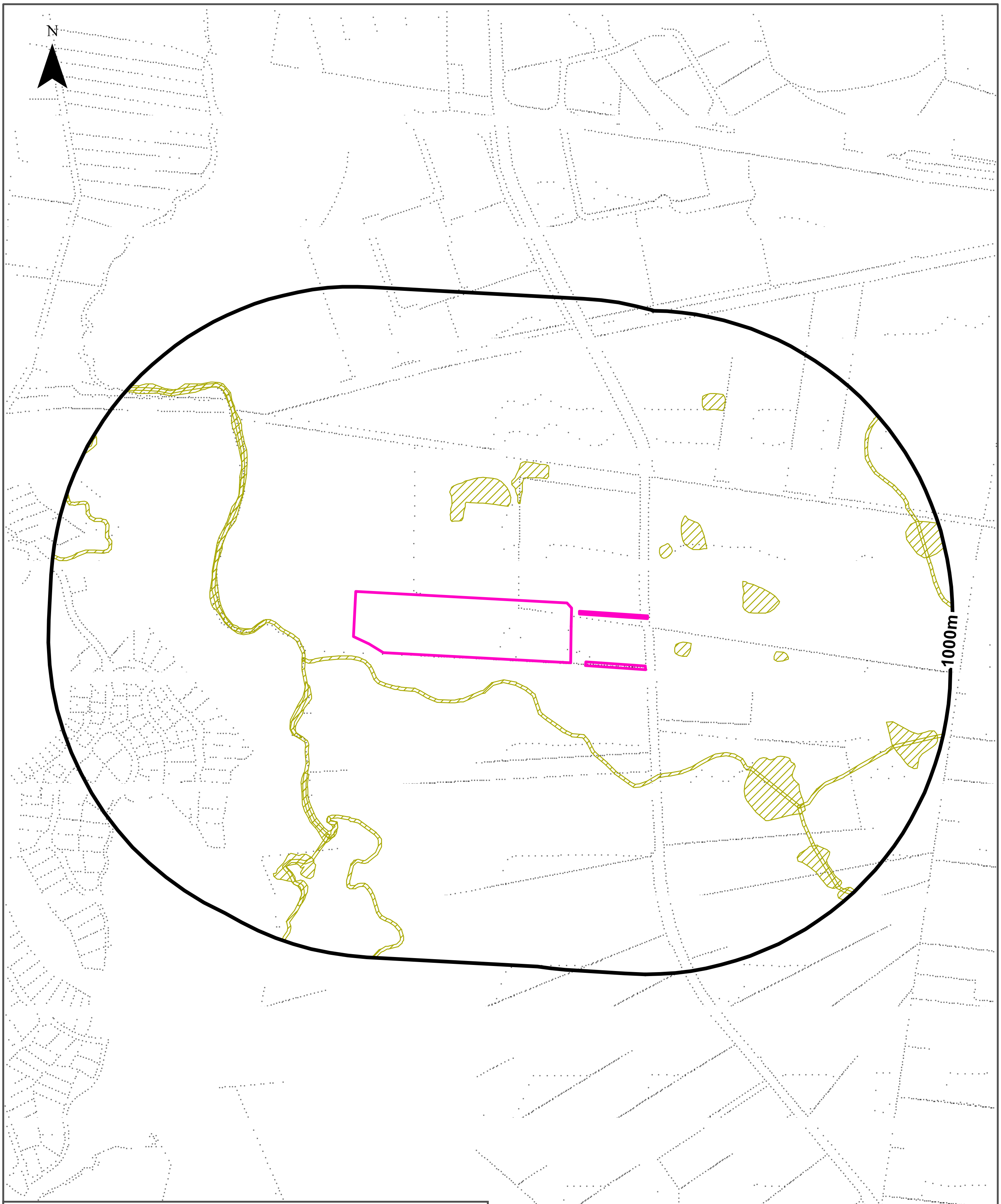
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

▭	Site Boundary	🟩	Delicensed Activities still Regulated by EPA
▭	Report Buffer	▨	Former Licensed/Regulated Activities (revoked or surrendered)
▭	Property Boundary	▨	Surrendered Licences related to Other Activities on Waterways incl. Application of Herbicides

Scale:
0 100 200 400 600 800
Meters

Property Boundary Data Source:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

EPA Activities

707-769 Mamre Road, Kemps Creek, NSW 2178

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	51m	-
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	51m	-
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	51m	-

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

707-769 Mamre Road, Kemps Creek, NSW 2178

Business Directory Records 1950-1991 Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1986, 1982, 1970, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer						

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Business Directory Records 1950-1991
Road or Area Matches

Universal Business Directory records from years 1991, 1986, 1982, 1970, 1961 & 1950, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
	No records in buffer					

Historical Business Directories

707-769 Mamre Road, Kemps Creek, NSW 2178

Dry Cleaners, Motor Garages & Service Stations 1948-1993 Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer						

Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

Dry Cleaners, Motor Garages & Service Stations 1948-1993 Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
	No records in buffer					

Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

Aerial Imagery 2020

707-769 Mamre Road, Kemps Creek, NSW 2178

Scale:

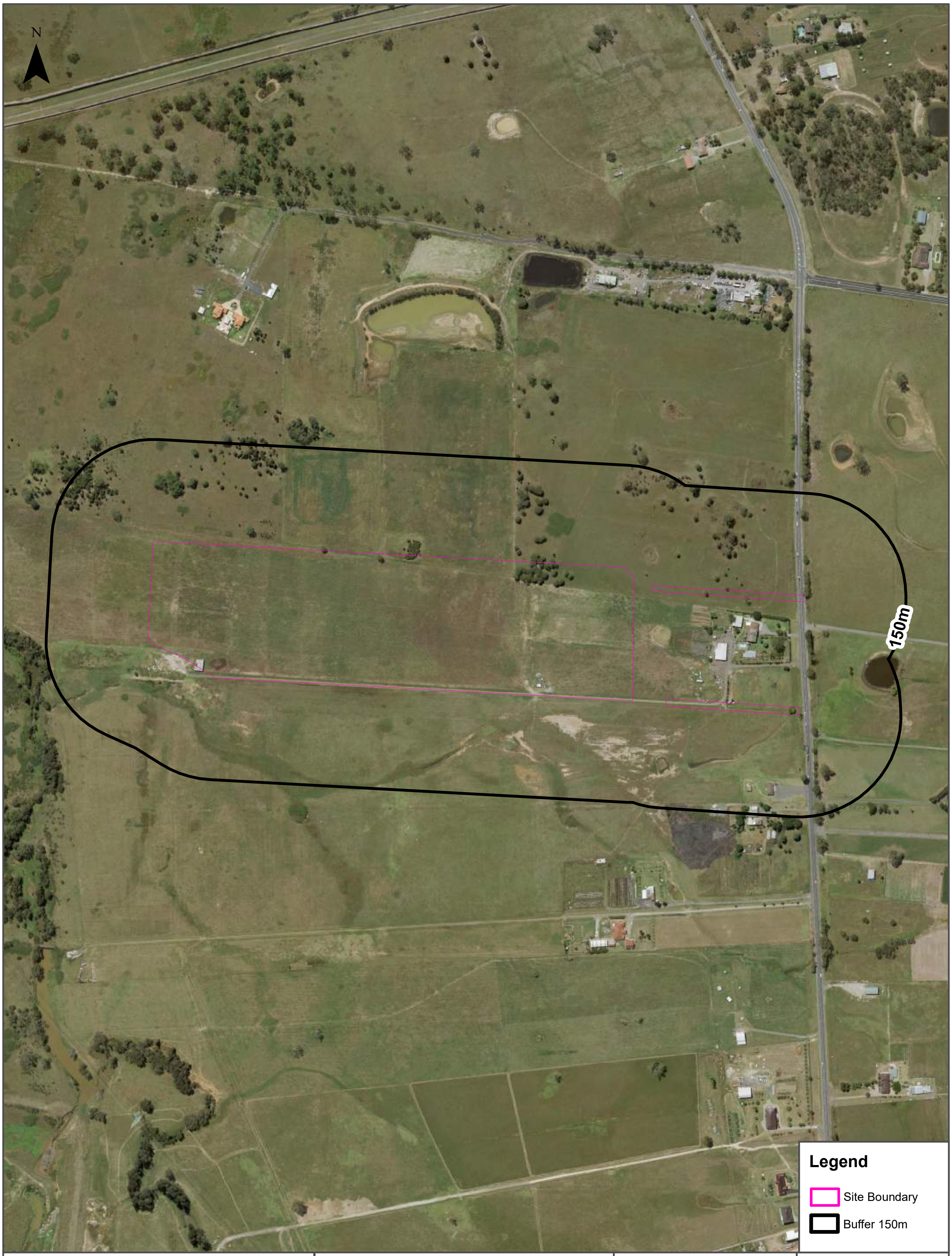
Data Sources: Aerial Imagery © Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 2015

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:

Data Sources: Aerial Imagery © Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 2009

707-769 Mamre Road, Kemps Creek, NSW 2178

Legend

🟪	Site Boundary
⬛	Buffer 150m

Scale: 0 80 160 240 320 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 12 February 2021

Aerial Imagery 1994

707-769 Mamre Road, Kemps Creek, NSW 2178

Scale:
0 90 180 270 360
Meters

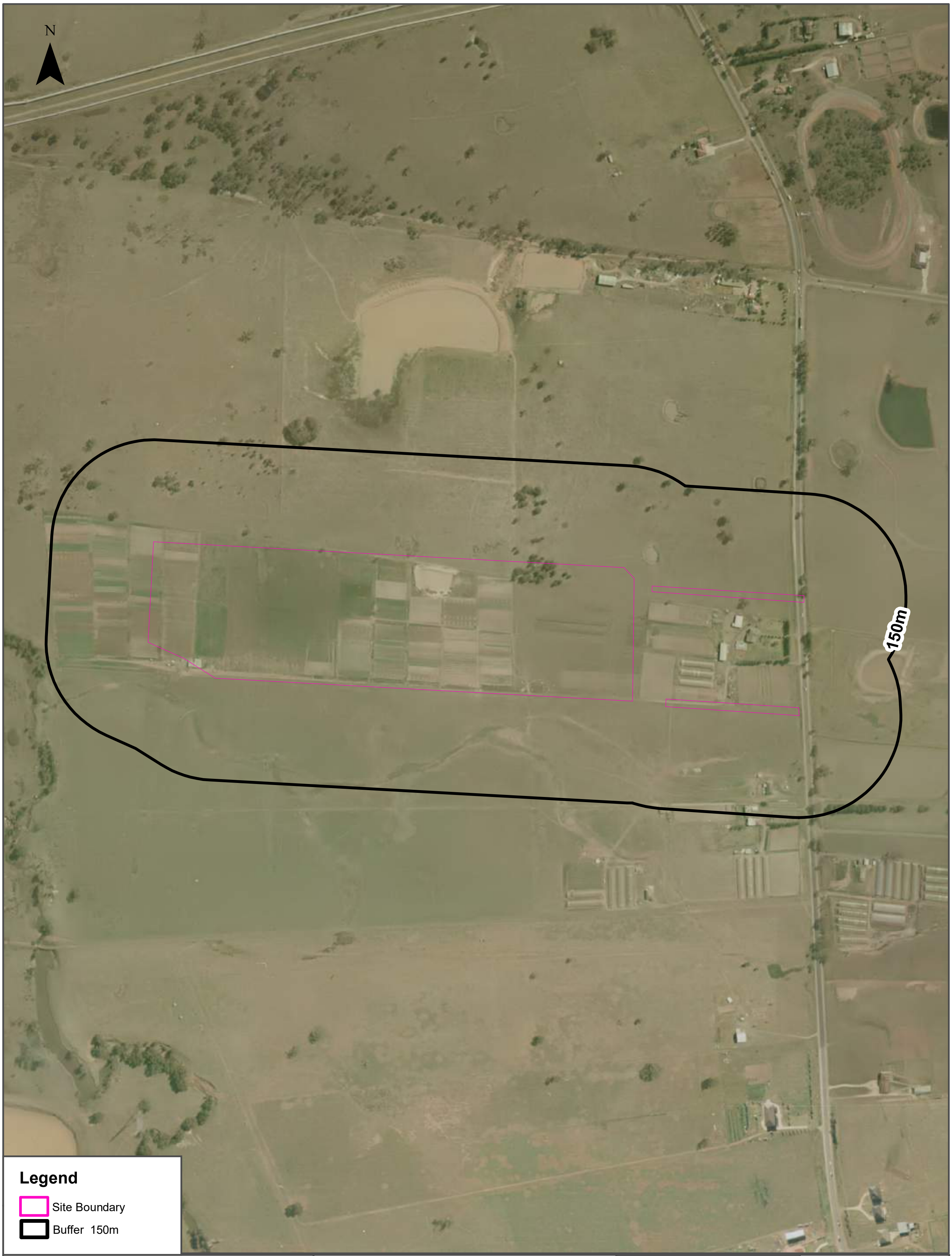
Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1991

707-769 Mamre Road, Kemps Creek, NSW 2178



Scale:

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1986

707-769 Mamre Road, Kemps Creek, NSW 2178

Scale:
0 90 180 270 360
Meters

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1982

707-769 Mamre Road, Kemps Creek, NSW 2178

Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:

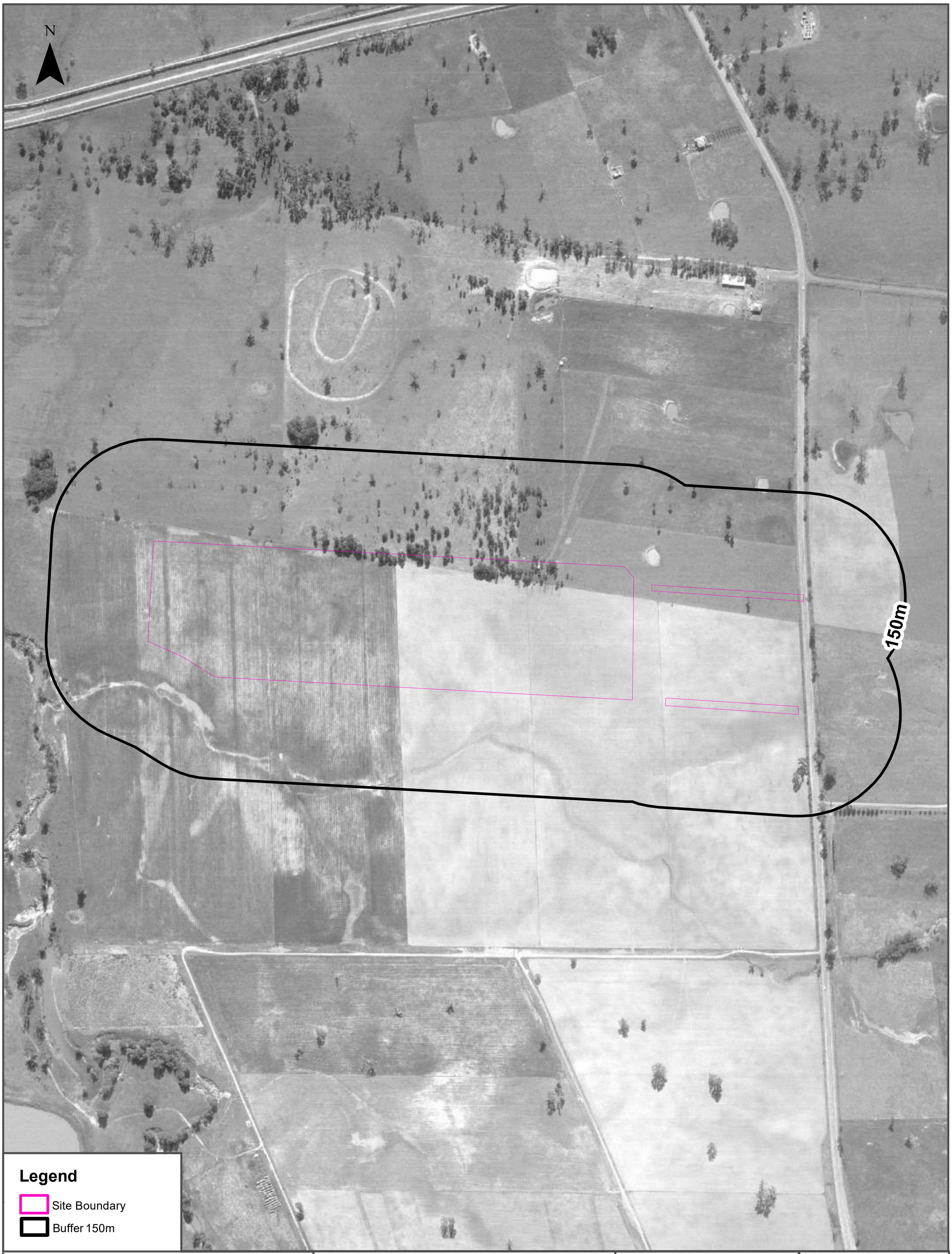
Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1978

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale: 0 90 180 270 360 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 12 February 2021

Aerial Imagery 1970

707-769 Mamre Road, Kemps Creek, NSW 2178

Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1965

707-769 Mamre Road, Kemps Creek, NSW 2178

Scale:
0 90 180 270 360
Meters

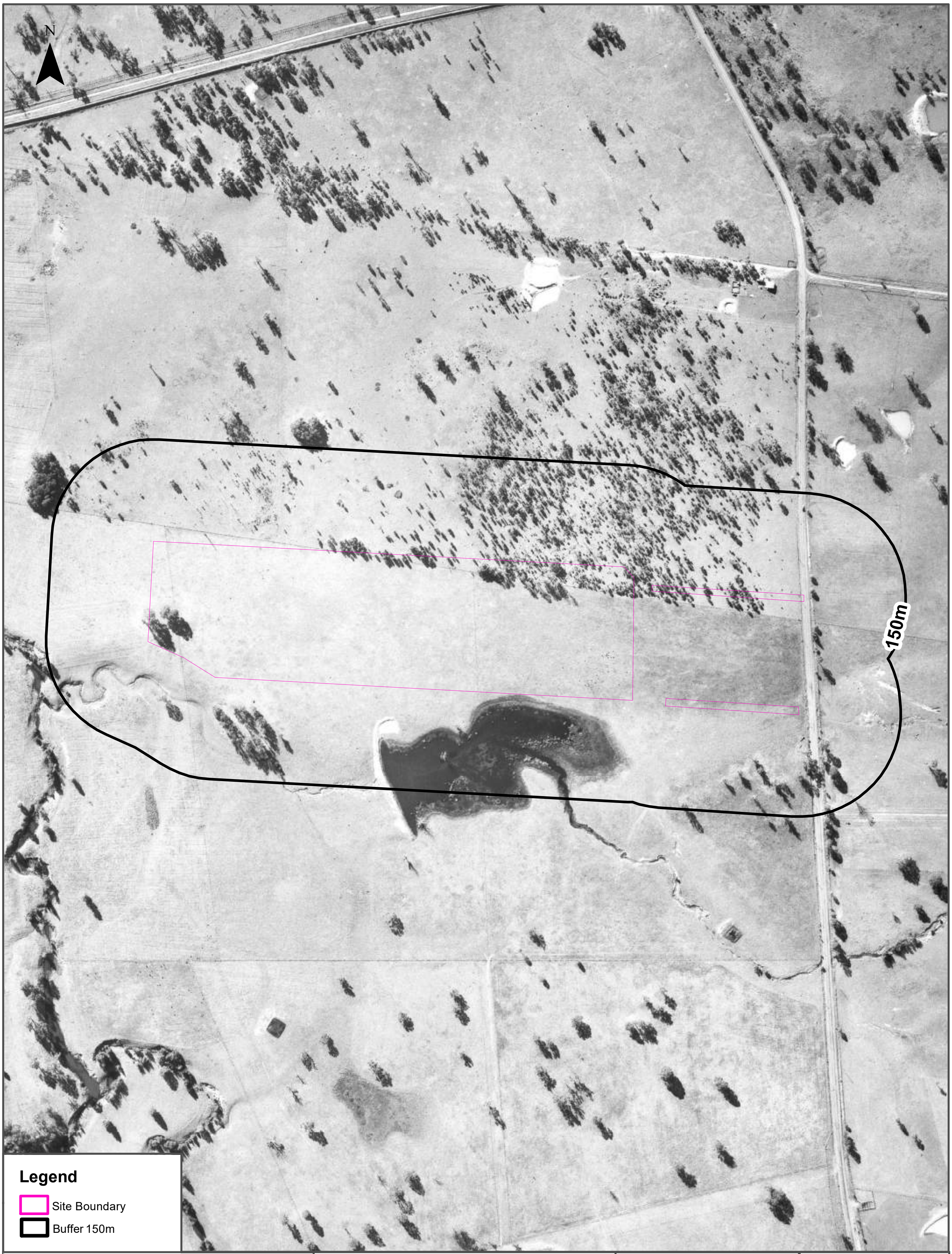
Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1961

707-769 Mamre Road, Kemps Creek, NSW 2178



Scale:
0 90 180 270 360
Meters

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1955

707-769 Mamre Road, Kemps Creek, NSW 2178

Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:

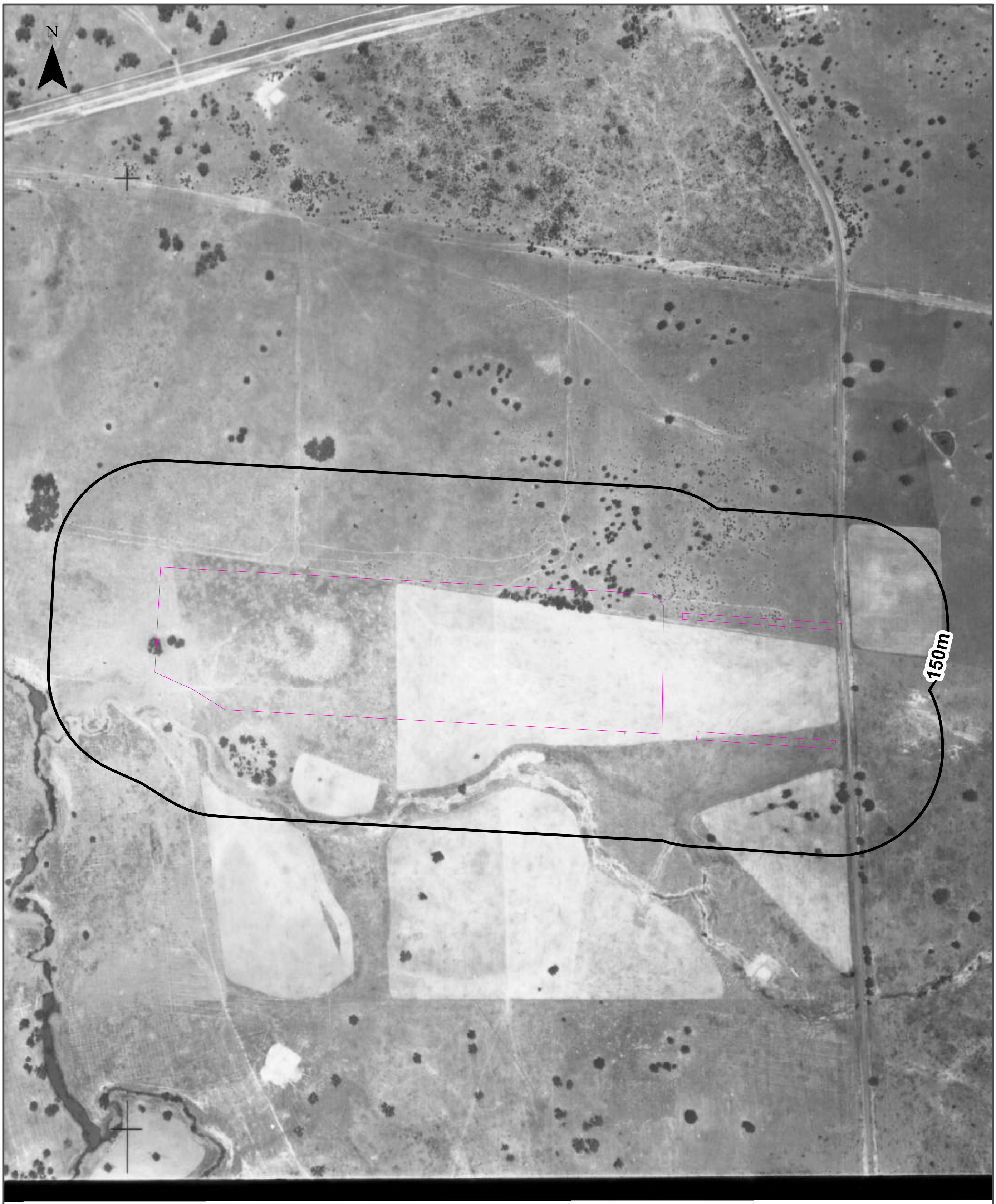
Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Aerial Imagery 1947

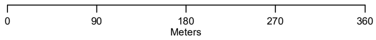
707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

🟪 Site Boundary

⬛ Buffer 150m



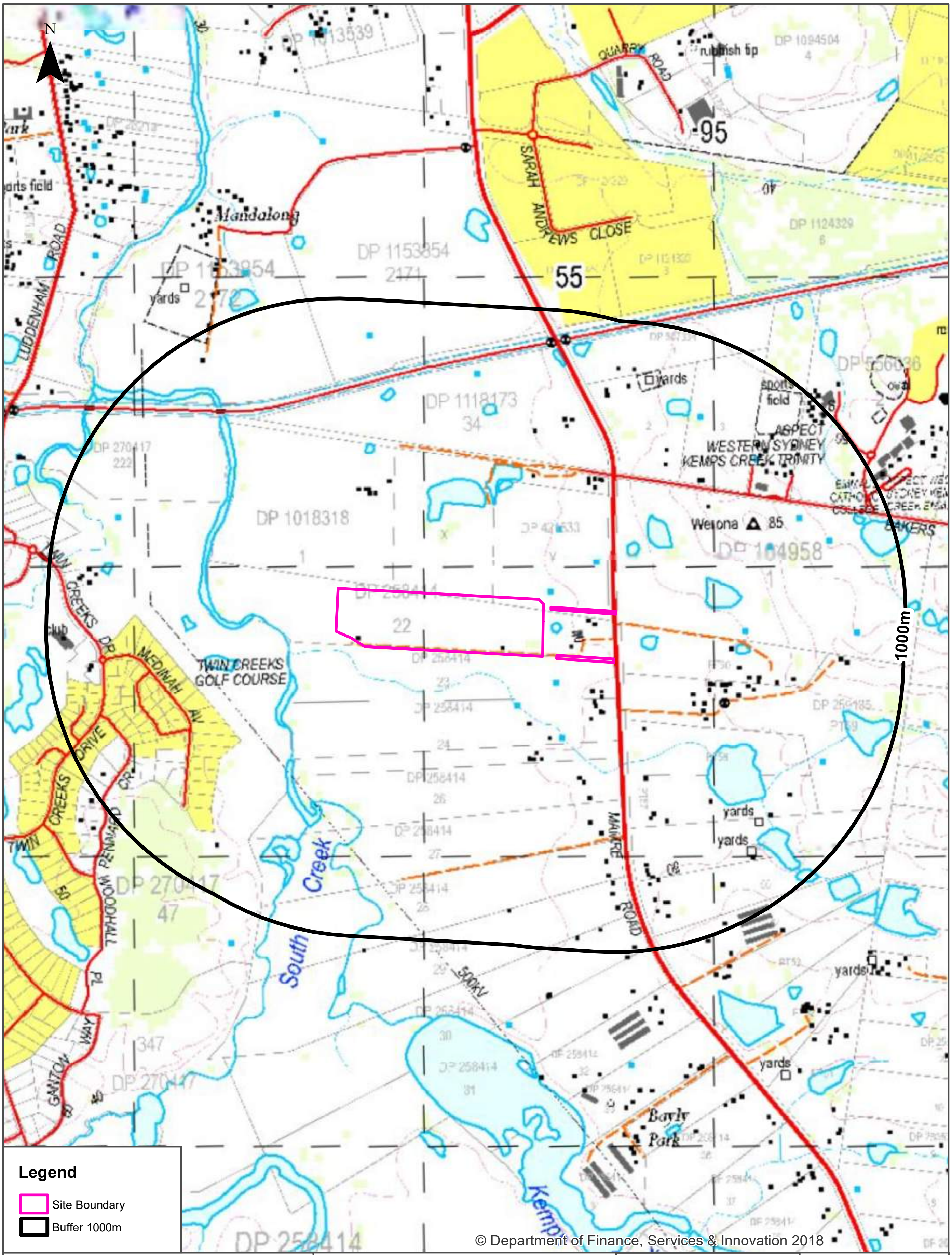
Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Topographic Map 2015

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

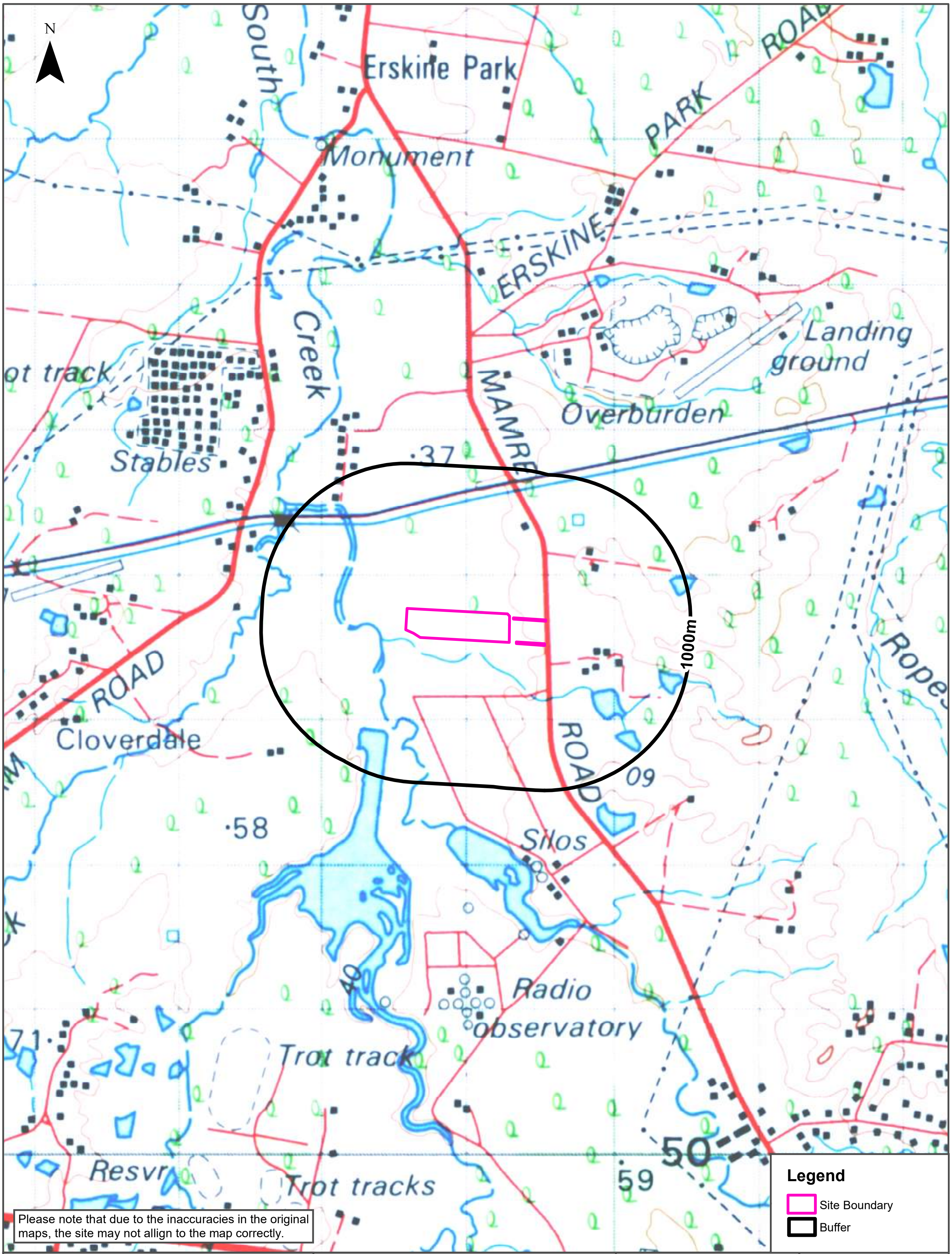
- Site Boundary
- Buffer 1000m

© Department of Finance, Services & Innovation 2018

Scale:	Data Sources: Topographic Map Data © NSW Land and Property Information	Coordinate System: GDA 1994 MGA Zone 56	Date: 12 February 2021
0 100 200 400 600 800 Meters			

Historical Map 1975

707-769 Mamre Road, Kemps Creek, NSW 2178



Please note that due to the inaccuracies in the original maps, the site may not allign to the map correctly.

Legend

🟪 Site Boundary

⬛ Buffer

Scale:
0 175 350 700 1,050 1,400 1,750
Meters

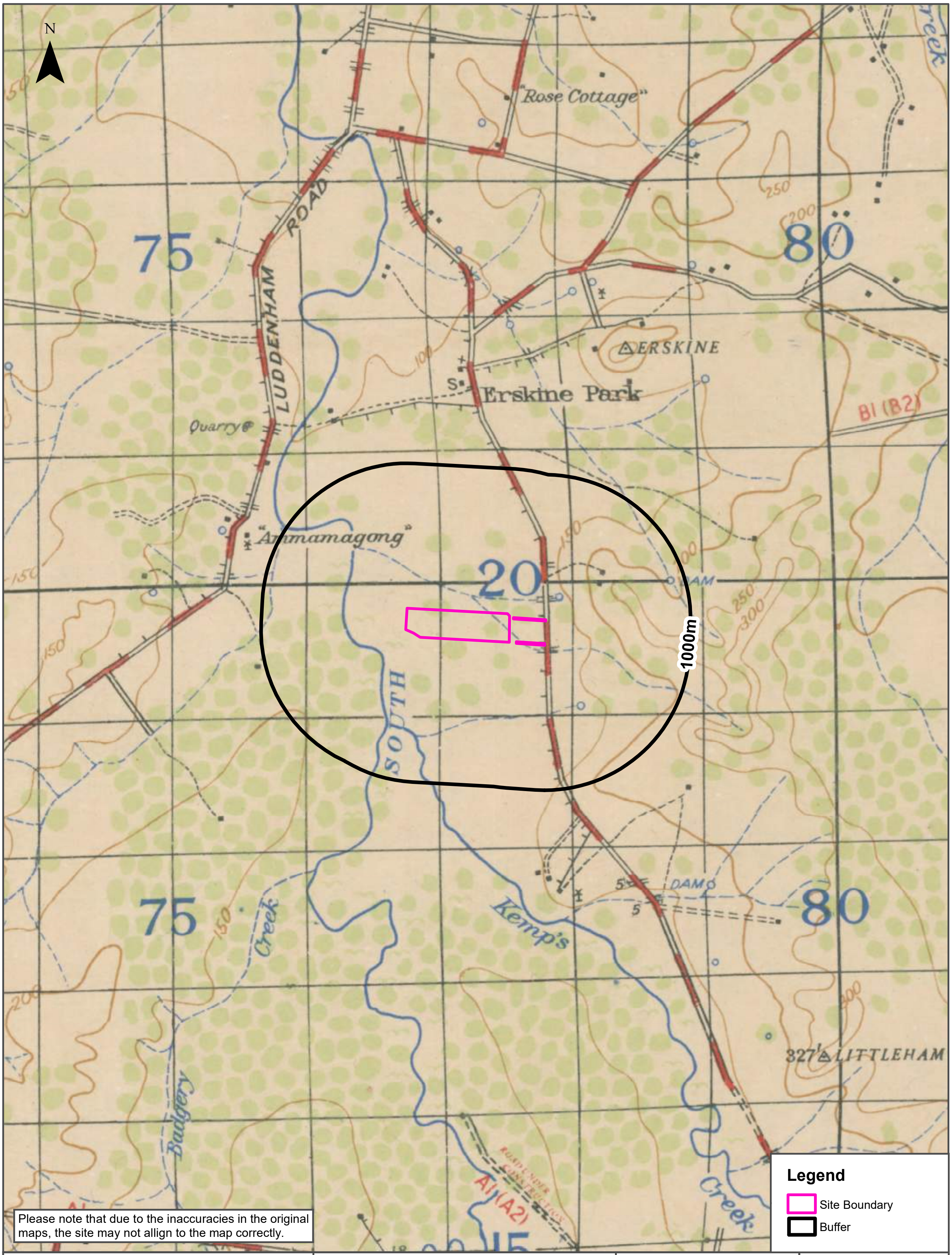
Data Sources: NATMAP 1:100,000
Topographic Maps Geoscience Australia

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Historical Map c.1942

707-769 Mamre Road, Kemps Creek, NSW 2178



Please note that due to the inaccuracies in the original maps, the site may not allign to the map correctly.

Legend

- 🟪 Site Boundary
- ⬛ Buffer

Scale:

0 175 350 700 1,050 1,400 1,750
Meters

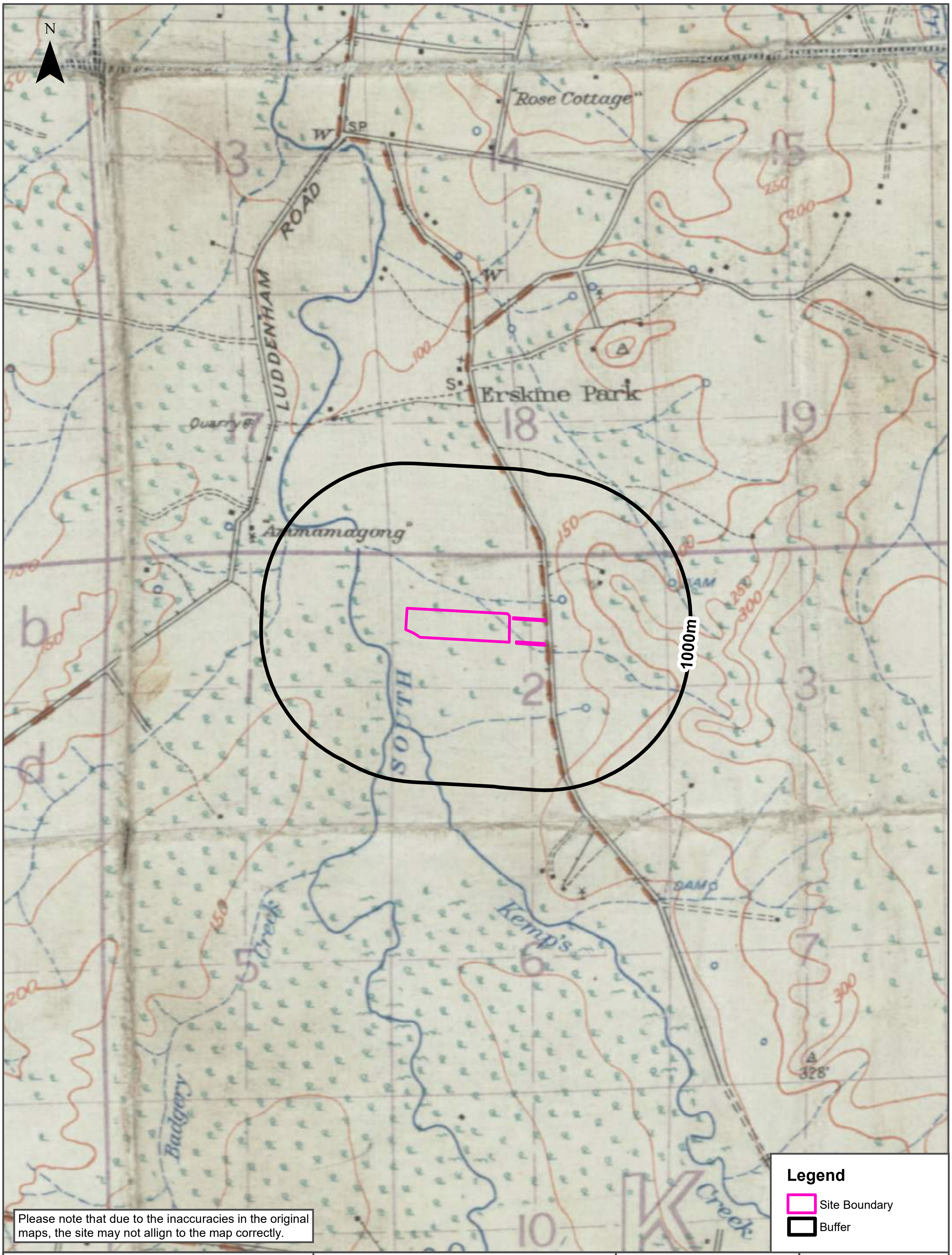
Data Sources: Australia 1:63360,
Produced by Australian Section Imperial General Staff

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Historical Map c.1929

707-769 Mamre Road, Kemps Creek, NSW 2178



Please note that due to the inaccuracies in the original maps, the site may not allign to the map correctly.

Legend

- ▢ Site Boundary
- ▢ Buffer

Scale:

0 175 350 700 1,050 1,400 1,750

Meters

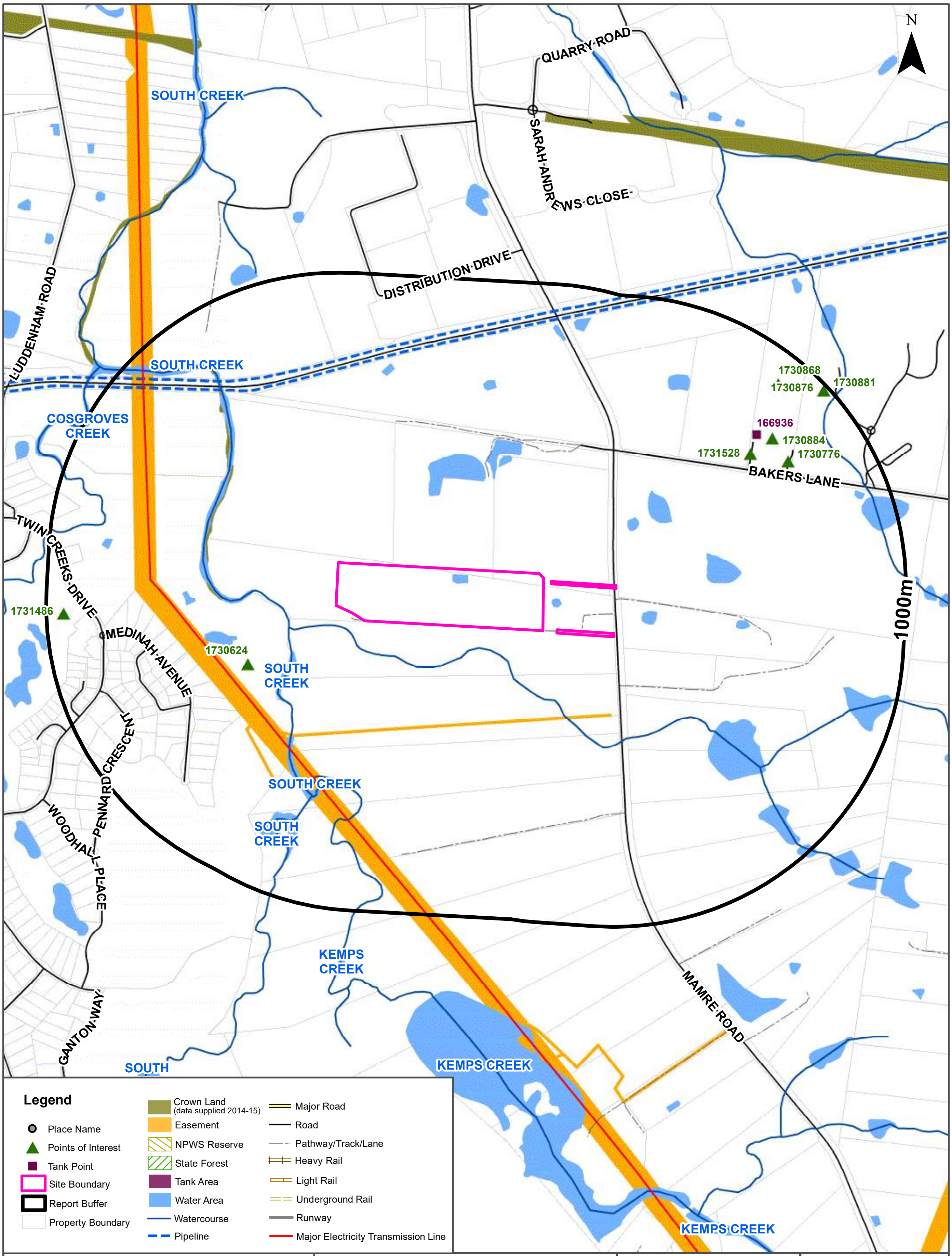
Data Sources: Australia 1:63360,
Produced by Australian Section Imperial General Staff

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Topographic Features

707-769 Mamre Road, Kemps Creek, NSW 2178



Scale:
0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Topographic Features

707-769 Mamre Road, Kemps Creek, NSW 2178

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
1730624	Golf Course	TWIN CREEKS GOLF COURSE	365m	West
1731528	Parking Area	Parking Area	649m	North East
1730776	Parking Area	Parking Area	732m	East
1730884	Combined Primary-Secondary School	MAMRE ANGLICAN SCHOOL	741m	North East
1730868	Sports Field	Sports Field	892m	North East
1731486	Club	TWIN CREEKS GOLF AND COUNTRY CULB	940m	West
1730876	Primary School	TRINITY CATHOLIC PRIMARY SCHOOL	984m	North East
1730881	Special School	ASPECT WESTERN SYDNEY KEMPS CREEK TRINITY	984m	North East

Topographic Data Source: © Land and Property Information (2015)

Topographic Features

707-769 Mamre Road, Kemps Creek, NSW 2178

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
166936	Water	Operational		19/08/2018	712m	North East

Tanks Data Source: © Land and Property Information (2015)

Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
120113155	Primary	Undefined		267m	South
120112693	Primary	Undefined		423m	South

Easements Data Source: © Land and Property Information (2015)

Topographic Features

707-769 Mamre Road, Kemps Creek, NSW 2178

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)

National Parks and Wildlife Service Reserves

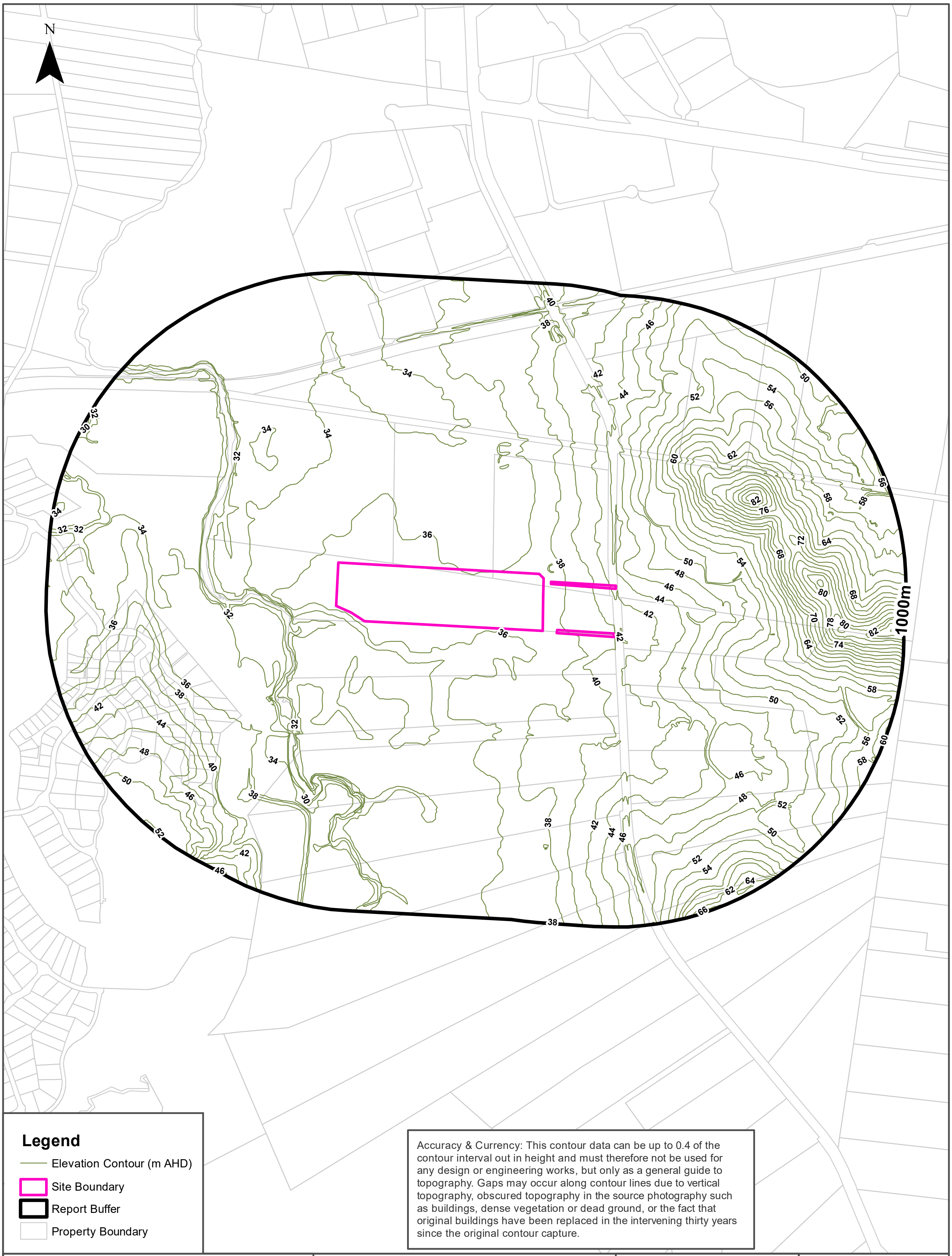
What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

NPWS Data Source: © NSW Department of Finance, Services & Innovation (2018)

Elevation Contours (m AHD)

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

- Elevation Contour (m AHD)
- Site Boundary
- Report Buffer
- Property Boundary

Accuracy & Currency: This contour data can be up to 0.4 of the contour interval out in height and must therefore not be used for any design or engineering works, but only as a general guide to topography. Gaps may occur along contour lines due to vertical topography, obscured topography in the source photography such as buildings, dense vegetation or dead ground, or the fact that original buildings have been replaced in the intervening thirty years since the original contour capture.

Scale:
0 100 200 400
Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021

Coordinate System: GDA 1994 MGA Zone 56

Date: 12 February 2021

Hydrogeology & Groundwater

707-769 Mamre Road, Kemps Creek, NSW 2178

Hydrogeology

Description of aquifers on-site:

Description
Porous, extensive aquifers of low to moderate productivity

Description of aquifers within the dataset buffer:

Description
Porous, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

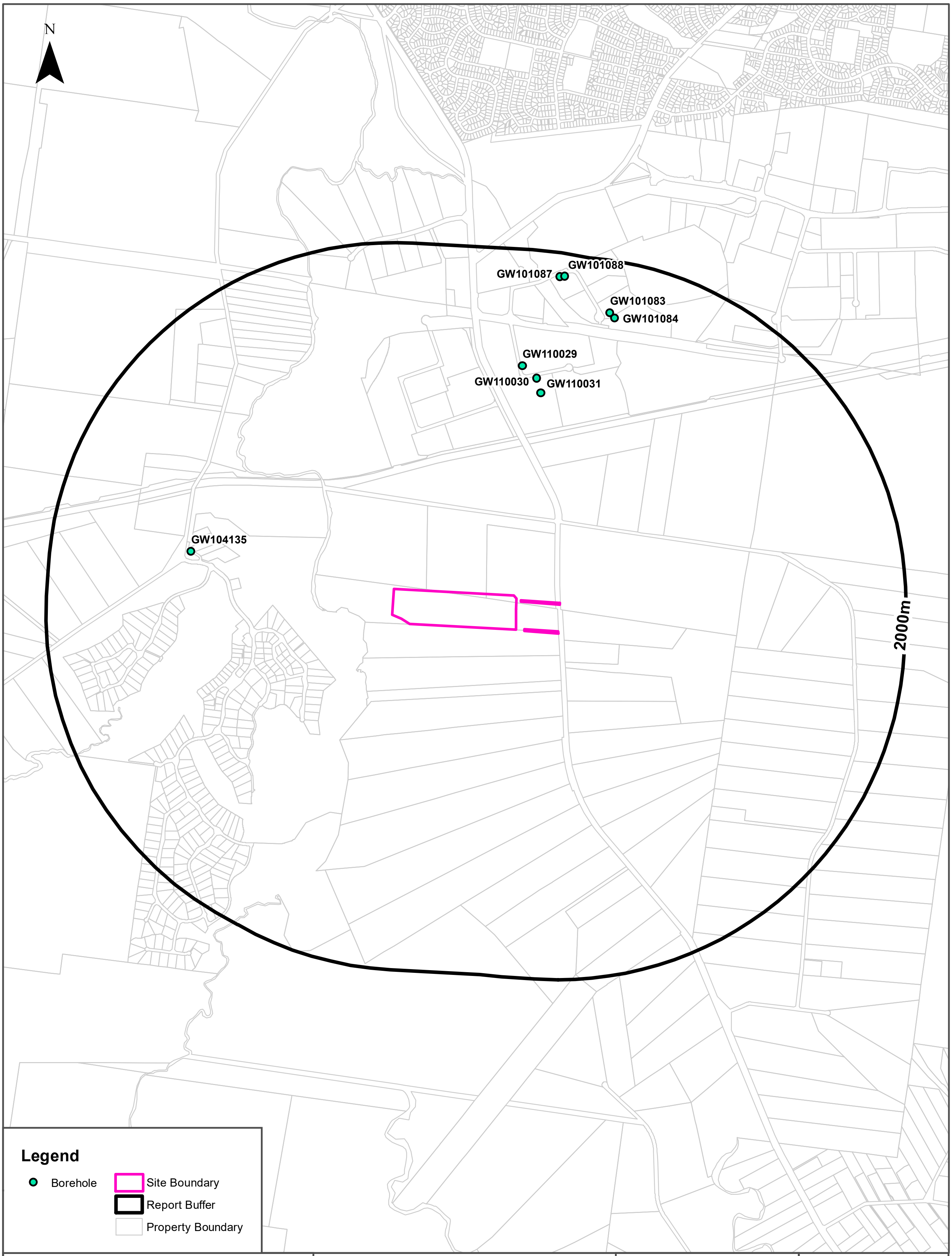
Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
N/A	No records in buffer		

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries

Groundwater Boreholes

707-769 Mamre Road, Kemps Creek, NSW 2178



Scale: 0 100 200 400 600 800 1,000 1,200 1,400 Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Hydrogeology & Groundwater

707-769 Mamre Road, Kemps Creek, NSW 2178

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW110031	10BL162687	Bore	Private	Monitoring Bore	Monitoring Bore		01/02/2004	0.75	0.75					1178m	North
GW104135	10BL159234	Bore		Test Bore			17/07/1999	366.00	366.00					1188m	West
GW110030	10BL162687	Bore	Private	Monitoring Bore	Monitoring Bore		01/02/2004	0.75	0.75					1263m	North
GW110029	10BL162687	Bore	Private	Monitoring Bore	Monitoring Bore		01/02/2004	0.75	0.75					1327m	North
GW101084	10BL157654	Bore		Monitoring Bore	Test Bore		28/05/1996	50.00	50.00					1674m	North East
GW101083	10BL157654	Bore		Monitoring Bore	Test Bore		28/05/1996	78.00	78.00		9.12			1699m	North East
GW101087	10BL157654	Bore		Monitoring Bore	Test Bore		31/05/1996	90.30	90.30					1861m	North
GW101088	10BL157654	Bore		Monitoring Bore	Test Bore		30/05/1996	60.20	60.20					1866m	North

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Hydrogeology & Groundwater

707-769 Mamre Road, Kemps Creek, NSW 2178

Driller's Logs

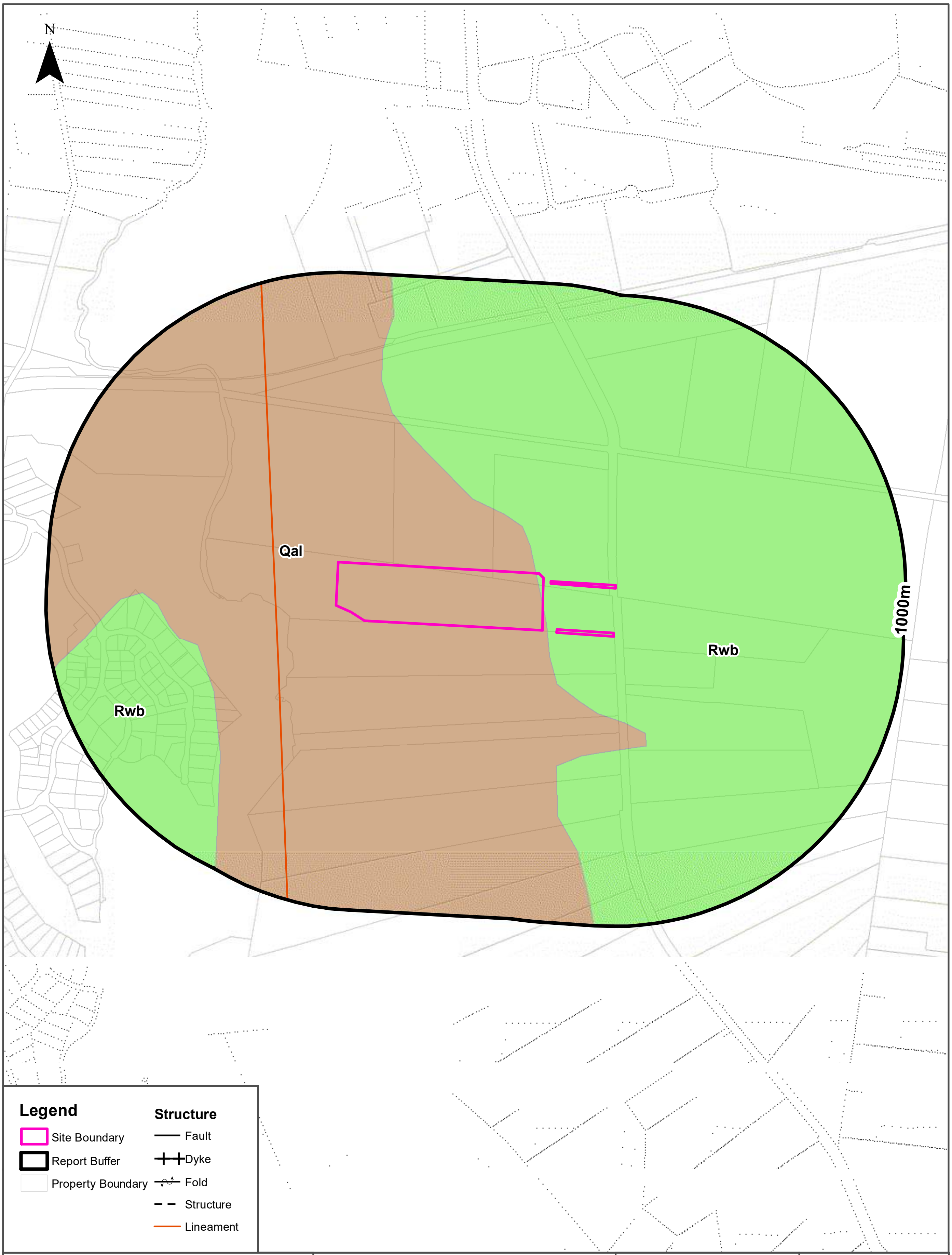
Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW110031	0.00m-0.20m TOPSOIL 0.20m-0.40m SILTY CLAY 0.40m-0.75m HEAVY CLAY	1178m	North
GW104135	0.00m-9.00m CLAY 9.00m-195.00m SHALE 195.00m-249.00m SANDSTONE 249.00m-250.00m SHALE 250.00m-280.00m SANDSTONE 280.00m-281.00m SHALE 281.00m-285.00m SANDSTONE 285.00m-295.00m SHALE 295.00m-308.00m SANDSTONE 308.00m-310.00m SHALE 310.00m-322.00m SANDSTONE 322.00m-329.00m SHALE 329.00m-336.00m SANDSTONE 336.00m-345.00m SHALE 345.00m-366.00m BROWN SHALE	1188m	West
GW110030	0.00m-0.20m TOPSOIL 0.20m-0.60m SILTY CLAY 0.60m-0.75m HEAVY CLAY	1263m	North
GW110029	0.00m-0.20m TOPSOIL 0.20m-0.50m SILTY CLAY 0.50m-0.75m HEAVY CLAY	1327m	North

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp

Geology 1:100,000

707-769 Mamre Road, Kemps Creek, NSW 2178



Scale:

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Geology

707-769 Mamre Road, Kemps Creek, NSW 2178

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Qal	Fine-grained sand, silt and clay				Quaternary		Penrith	1:100,000
Rwb	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Qal	Fine-grained sand, silt and clay				Quaternary		Penrith	1:100,000
Rwb	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:100,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Dataset
Lineament		Narellan Lineament	Penrith	1:100,000
Lineament		Narellan Lineament	Penrith	1:100,000

Geological Data Source : NSW Department of Industry, Resources & Energy

Naturally Occurring Asbestos Potential

707-769 Mamre Road, Kemps Creek, NSW 2178

Naturally Occurring Asbestos Potential

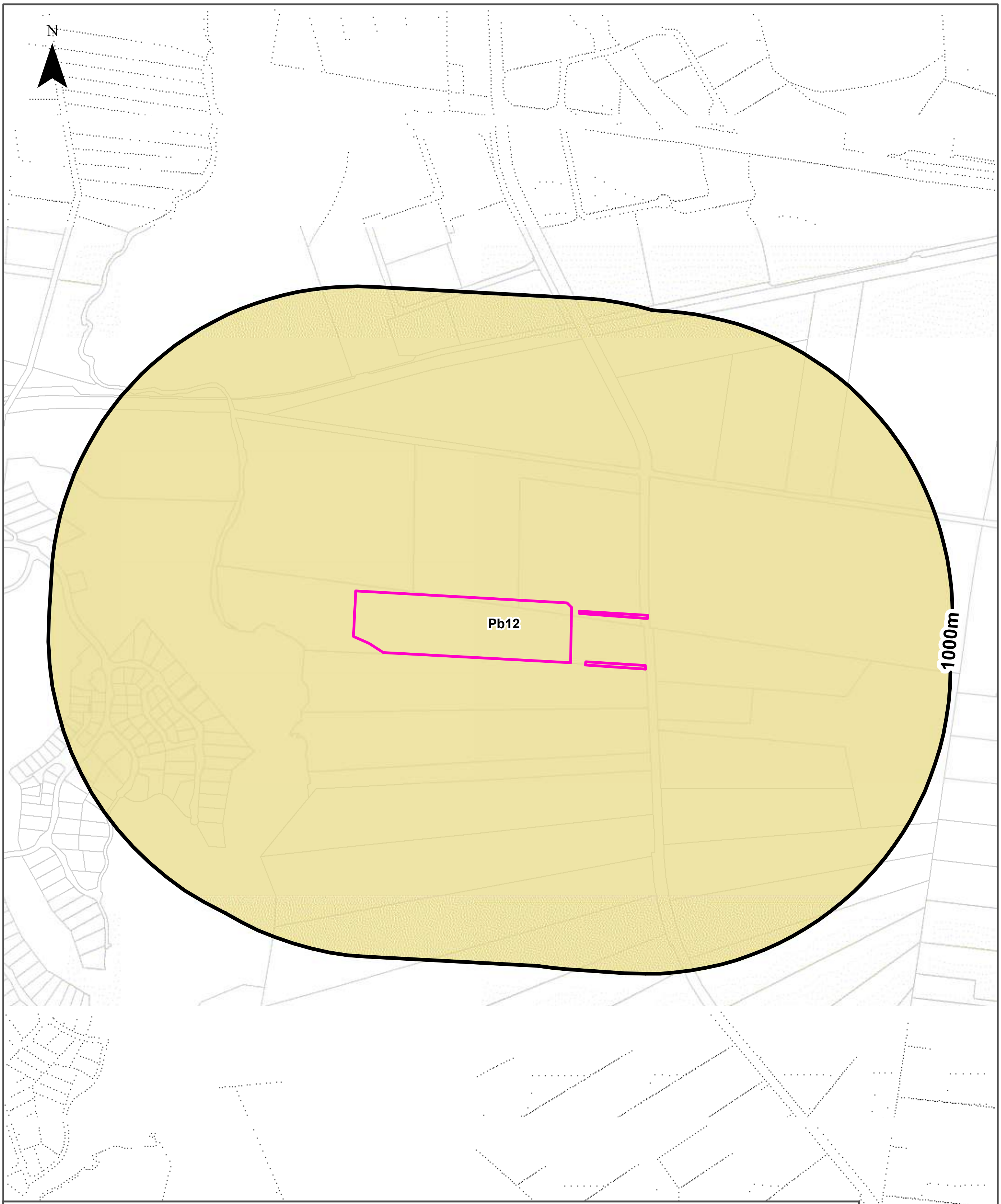
Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Naturally Occurring Asbestos Potential Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Atlas of Australian Soils

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

- □ Site Boundary
- ■ Report Buffer
- □ Property Boundary

Australian Soil Classification Orders

- ■ Anthroposol
- ■ Calcarosol
- ■ Chromosol
- ■ Dermosol
- ■ Ferrosol
- ■ Hydrosol
- ■ Kandosol
- ■ Kurosol
- ■ Organosol
- ■ Podosol
- ■ Rudosol
- ■ Sodosol
- ■ Tenosol
- ■ Vertosol
- ■ Lake
- □ No Data

Scale:
0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Soils

707-769 Mamre Road, Kemps Creek, NSW 2178

Atlas of Australian Soils

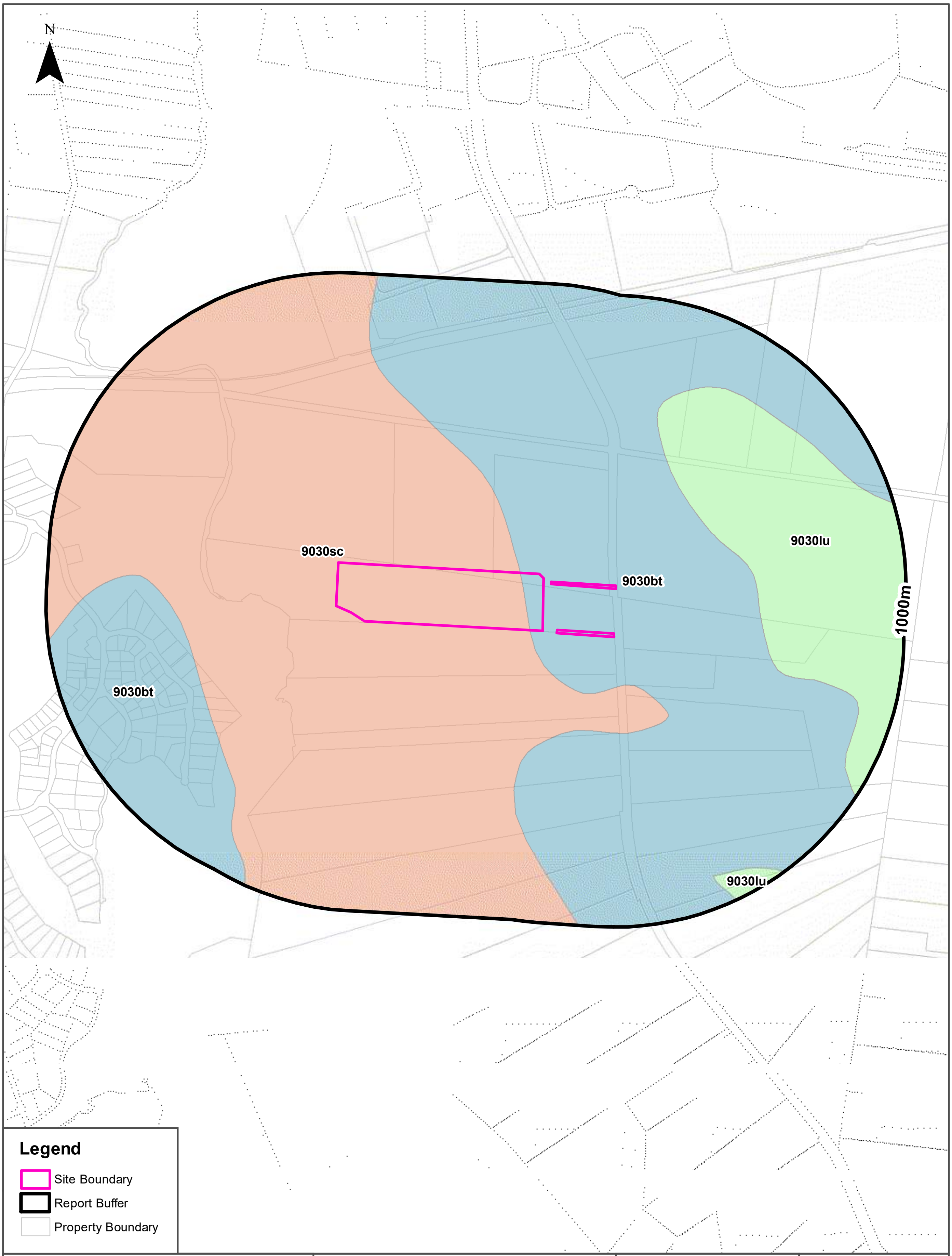
Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance
Pb12	Kurosol	Gently rolling to rounded hilly country with some steep slopes and broad valleys: chief soils are hard acidic red soils (Dr2.21) with hard neutral and acidic yellow mottled soils (Dy3.42 and Dy3.41) on lower slopes and in valleys. Associated are small areas of various soils including (Gn3.54) on some ridges, (Dr3.31) on some slopes; (Dr2.23) in saddles and some mid-slope positions, and some low- lying swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Small areas of other soils such as (Db1.2) are likely throughout.	0m

Atlas of Australian Soils Data Source: CSIRO

Soil Landscapes of Central and Eastern NSW

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

- Site Boundary
- Report Buffer
- Property Boundary

Scale:
0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Soils

707-769 Mamre Road, Kemps Creek, NSW 2178

Soil Landscapes of Central and Eastern NSW

What are the on-site Soil Landscapes?

Soil Code	Name
9030bt	Blacktown
9030sc	South Creek

What are the Soil Landscapes within the dataset buffer?

Soil Code	Name
9030bt	Blacktown
9030lu	Luddenham
9030sc	South Creek

Soil Landscapes of Central and Eastern NSW: NSW Department of Planning, Industry and Environment

Acid Sulfate Soils

707-769 Mamre Road, Kemps Creek, NSW 2178

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

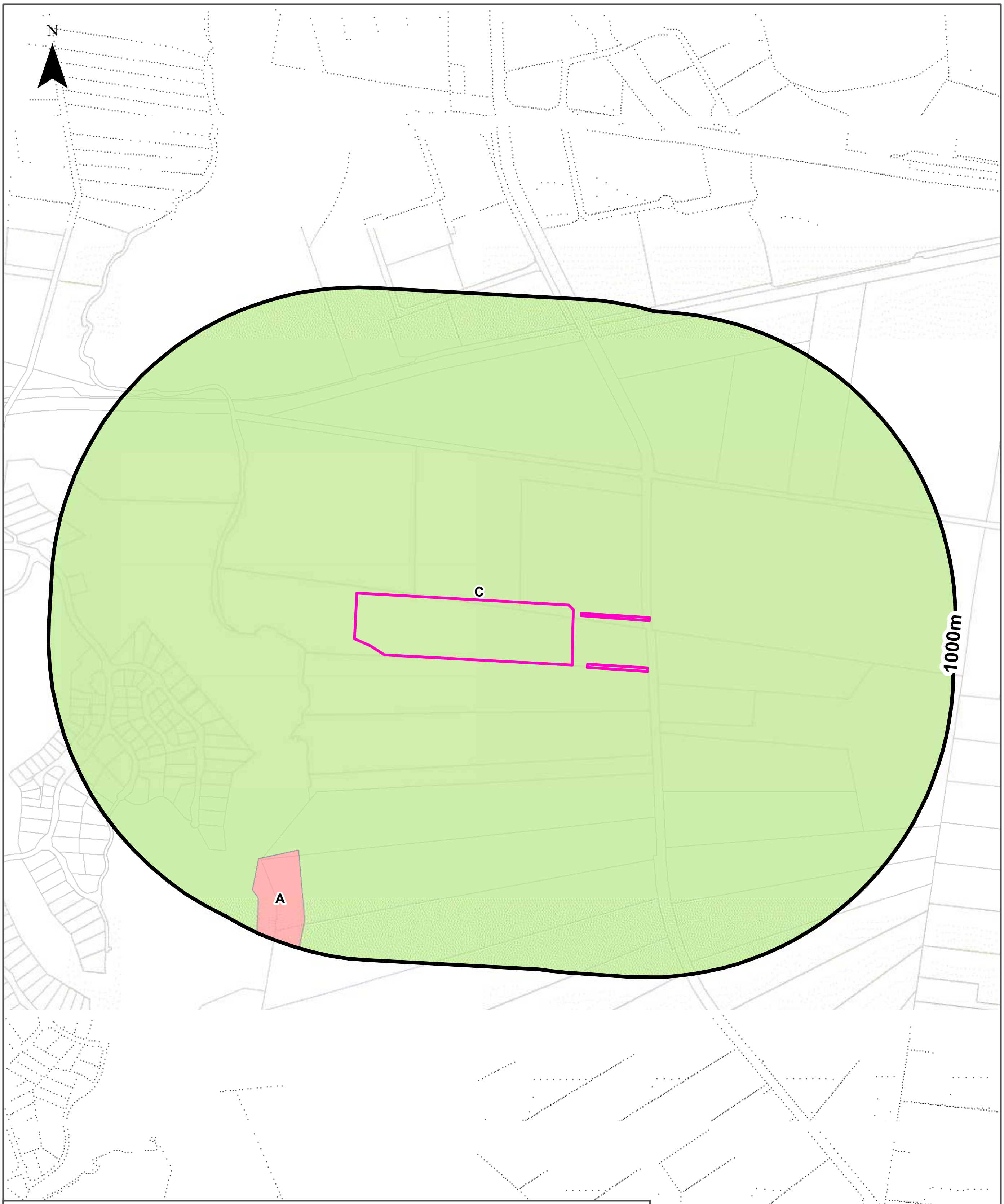
Soil Class	Description	EPI Name
N/A		

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

Atlas of Australian Acid Sulfate Soils

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

▭ Site Boundary

▭ Report Buffer

▭ Property Boundary

Probability of occurrence of Acid Sulfate Soils

🟥 A. High (>70%)

🟨 B. Low (6-70%)

🟩 C. Extremely Low (1-5%)

⬜ D. No Chance (0%)

⬜ No Data

Scale: 0 100 200 400 600 800 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 12February 2021

Acid Sulfate Soils

707-769 Mamre Road, Kemps Creek, NSW 2178

Atlas of Australian Acid Sulfate Soils

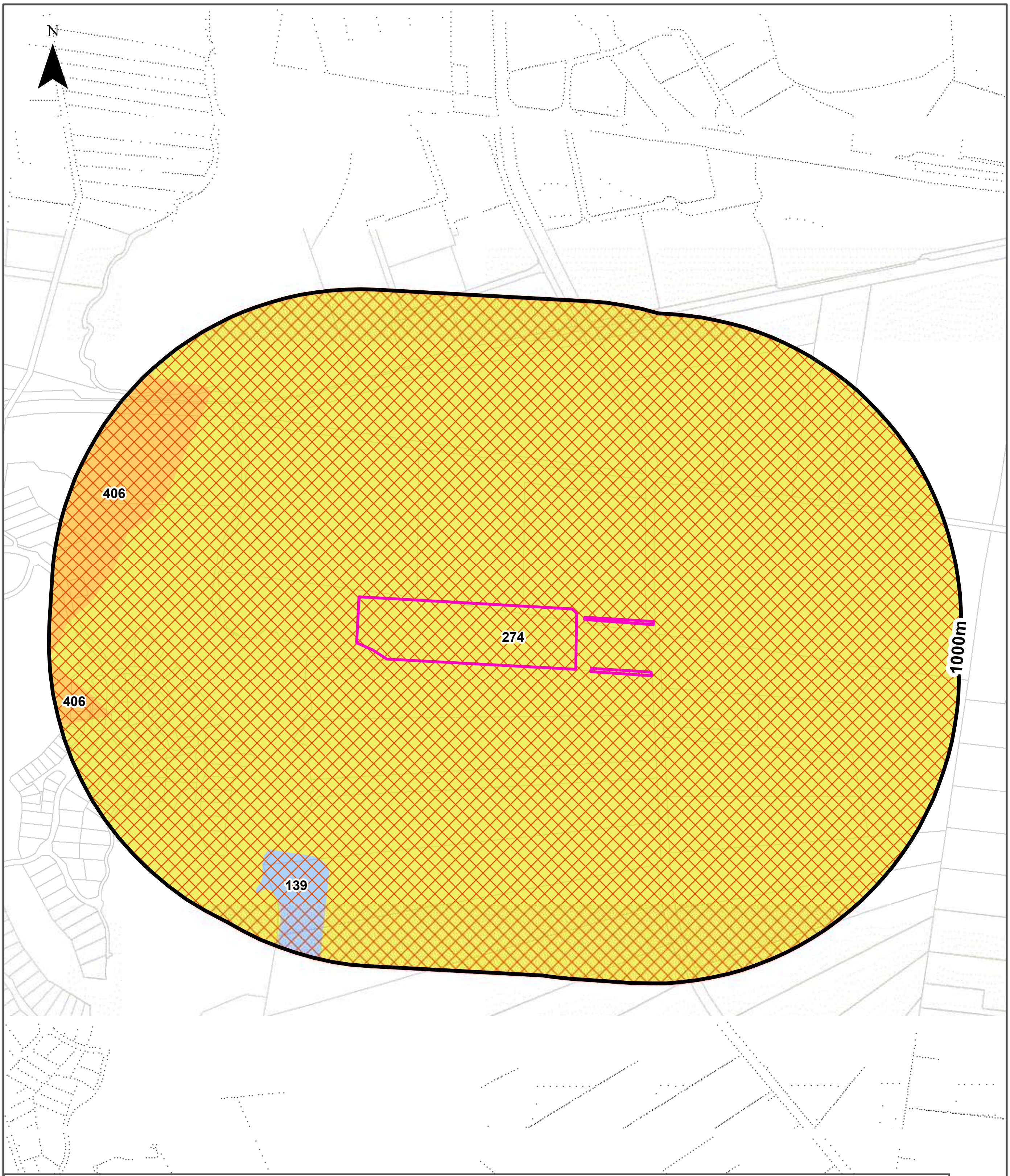
Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m
A	High Probability of occurrence. >70% chance of occurrence.	697m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

Dryland Salinity

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

☐ Site Boundary
☐ Report Buffer
☐ Property Boundary

Dryland Salinity - National Assessment

▨ Delineated risk area but no high hazard or risk rating for either 2000, 2020, 2050
▨ High hazard or risk in 2050 only
▨ High hazard or risk defined for 2050, but no assessment made for 2000 or 2020
▨ High hazard or risk in 2020 and 2050
▨ High hazard or risk in 2000 and 2050. 2020 not defined as high hazard
▨ High hazard or risk defined for all years: 2000, 2020, 2050

Salinity Potential of Western Sydney

🟥 Area of Known Salinity
🟧 Area of High Salinity Potential
🟨 Area of Moderate Salinity Potential
🟩 Area of Very Low Salinity Potential
🟦 Area of Water

Scale:

0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Dryland Salinity

707-769 Mamre Road, Kemps Creek, NSW 2178

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

Yes

Is there Dryland Salinity - National Assessment data within the dataset buffer?

Yes

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
High hazard or risk	High hazard or risk	High hazard or risk	0m	Onsite

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
274	MODERATE	Area of Moderate Salinity Potential	0m	Onsite
139	WATER	Area of Water	684m	South
406	HIGH	Area of High Salinity Potential	706m	South West

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage

Mining

707-769 Mamre Road, Kemps Creek, NSW 2178

Mining Subsidence Districts

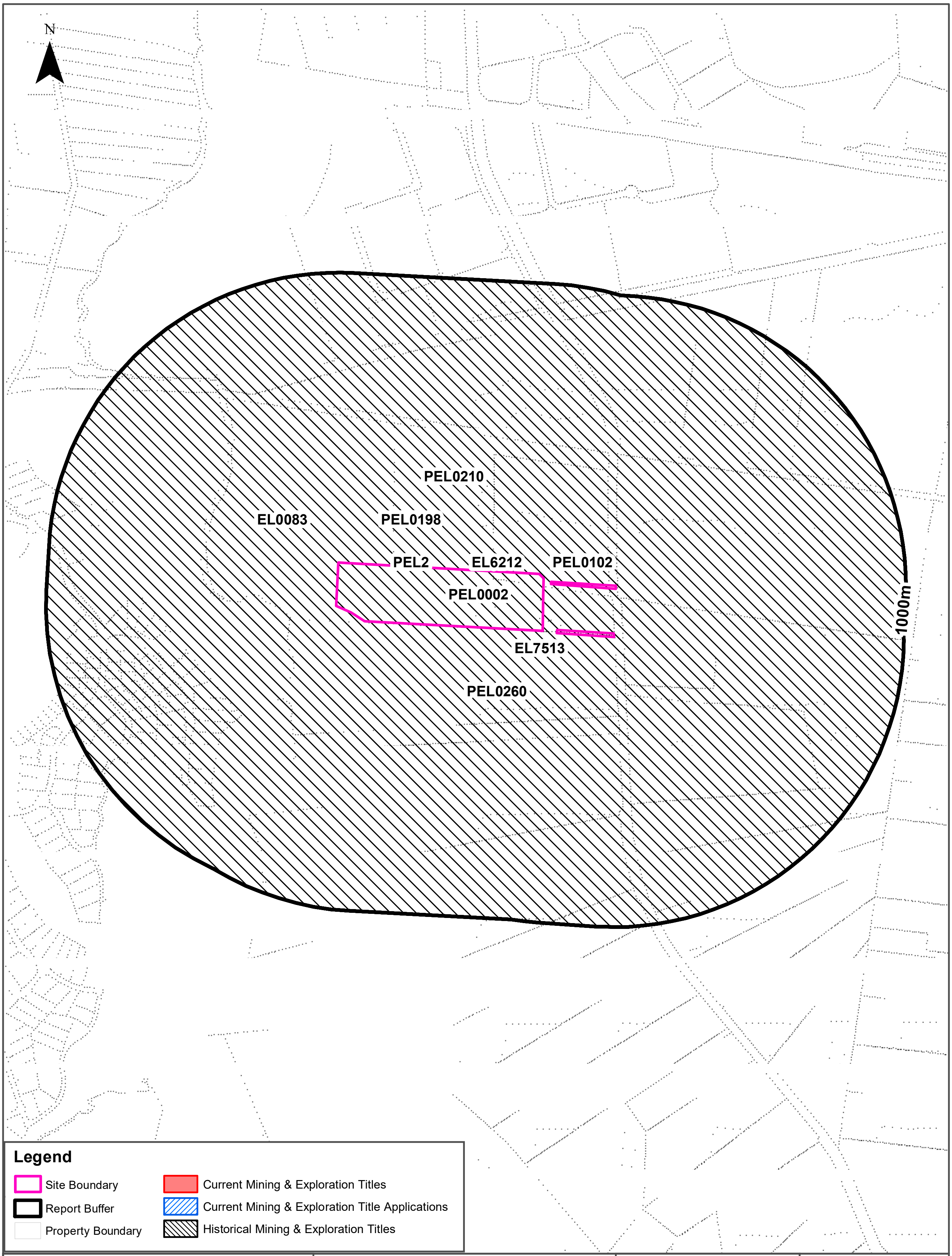
Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)

Mining & Exploration Titles

707-769 Mamre Road, Kemps Creek, NSW 2178



Scale: 0 100 200 400 600 800 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 12 February 2021

Mining

707-769 Mamre Road, Kemps Creek, NSW 2178

Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist (m)	Dir'
N/A	No Records in Buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist (m)	Dir'
N/A	No Records in Buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

Mining

707-769 Mamre Road, Kemps Creek, NSW 2178

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist (m)	Dir'
EL0083	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	01 Feb 1967	01 Feb 1968	MINERALS		0m	Onsite
EL6212	HOT ROCK ENERGY PTY LTD,LONGREACH OIL LIMITED	4 Mar 2004	3 Mar 2013	MINERALS	Geothermal	0m	Onsite
EL7513	GRADIENT ENERGY LIMITED	7 Apr 2010	15 Apr 2011	MINERALS	Geothermal	0m	Onsite
PEL0002	AGL UPSTREAM INVESTMENTS PTY LIMITED	29/03/1993	6/07/2015	PETROLEUM	Petroleum	0m	Onsite
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	Onsite
PEL0198	JOHN STREVENS (TERRIGAL) NL			PETROLEUM	Petroleum	0m	Onsite
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	Onsite
PEL0260	NORTH BULLI COLLIERIES PTY LTD, AGL PETROLEUM OPERATIONS PTY LTD, THE AUSTRALIAN GAS LIGHT CO.	9/09/1981	8/03/1993	PETROLEUM	Petroleum	0m	Onsite
PEL2	AGL UPSTREAM INVESTMENTS PTY LIMITED			MINERALS		0m	Onsite

Historical Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

State Environmental Planning Policy

707-769 Mamre Road, Kemps Creek, NSW 2178

State Significant Precincts

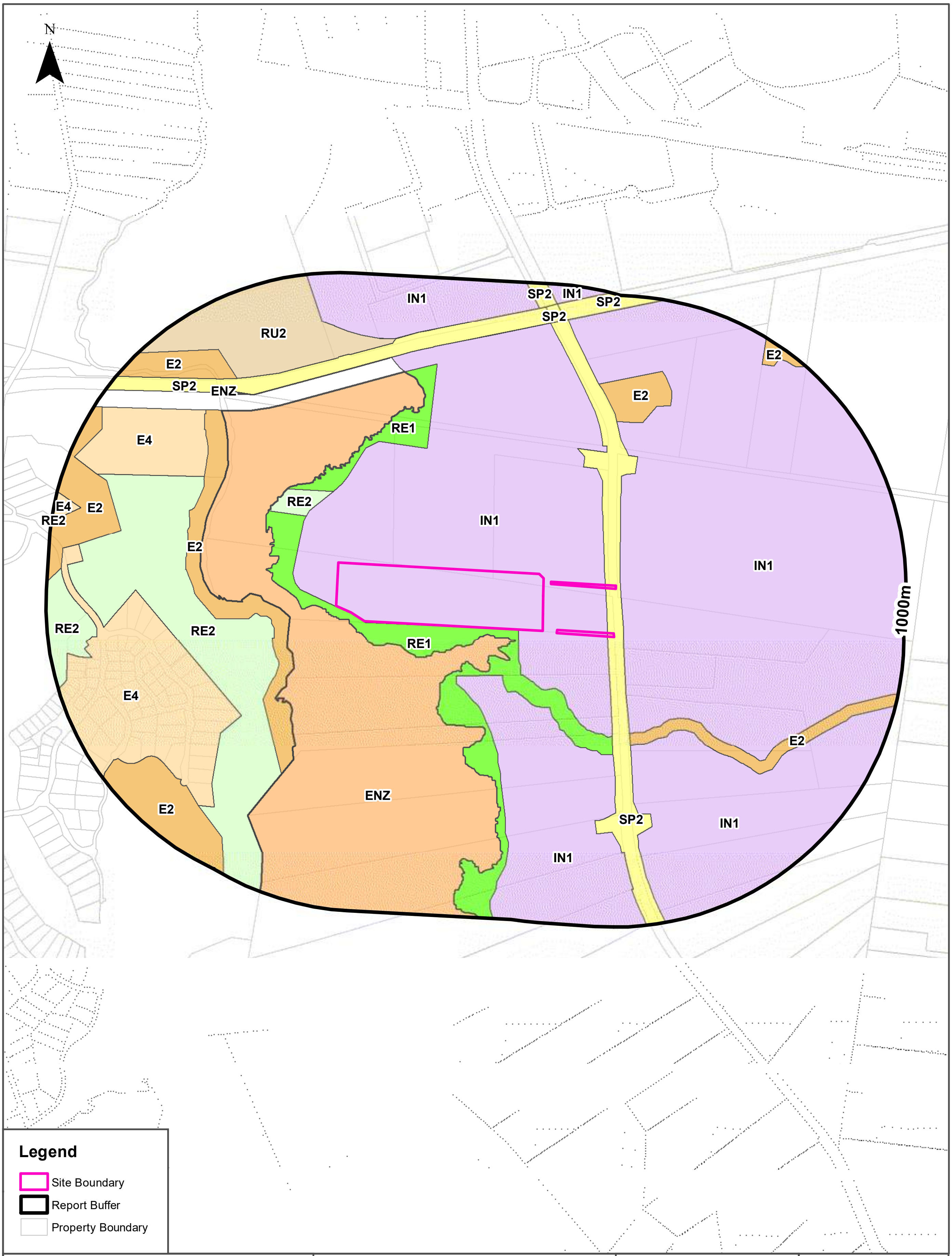
What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No Records in Buffer							

State Environment Planning Policy Data Source: NSW Crown Copyright - Planning & Environment

EPI Planning Zones

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

🟪 Site Boundary
⬛ Report Buffer
⬜ Property Boundary

Scale:

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021
Planning: NSW Crown Copyright - Planning & Environment

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Environmental Planning Instrument

707-769 Mamre Road, Kemps Creek, NSW 2178

Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
IN1	General Industrial		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/09/2020	01/10/2020	11/09/2020	State Environmental Planning Policy (Western Sydney Aerotropolis) Amendment	0m	Onsite
SP2	Infrastructure	Classified Road	State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/09/2020	01/10/2020	11/09/2020	State Environmental Planning Policy (Western Sydney Aerotropolis) Amendment	0m	South East
RE1	Public Recreation		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/09/2020	01/10/2020	11/09/2020	State Environmental Planning Policy (Western Sydney Aerotropolis) Amendment	1m	South
IN1	General Industrial		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/06/2020	11/06/2020	11/06/2020	State Environmental Planning Policy (Western Sydney Employment Area) Amendment 2020	16m	East
ENZ	Environment and Recreation		State Environmental Planning Policy (Western Sydney Aerotropolis) 2020	11/09/2020	01/10/2020	11/09/2020		21m	South
IN1	General Industrial		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/09/2020	01/10/2020	11/09/2020	State Environmental Planning Policy (Western Sydney Aerotropolis) Amendment	161m	South East
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	02/10/2020	02/10/2020	18/12/2020	Local Environmental Plan Amendment (Major Infrastructure Corridors—Maps) 2020	162m	West
RE2	Private Recreation		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/09/2020	01/10/2020	11/09/2020	State Environmental Planning Policy (Western Sydney Aerotropolis) Amendment	196m	North West
RE2	Private Recreation		Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	18/12/2020	Amendment No 23	225m	West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE1	Public Recreation		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/09/2020	01/10/2020	11/09/2020	State Environmental Planning Policy (Western Sydney Aerotropolis) Amendment	248m	North
E2	Environmental Conservation		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/06/2020	11/06/2020	11/06/2020	State Environmental Planning Policy (Western Sydney Employment Area) Amendment 2020	337m	East
E4	Environmental Living		Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	18/12/2020	Amendment No 23	493m	South West
E4	Environmental Living		Penrith Local Environmental Plan 2010	02/10/2020	02/10/2020	18/12/2020	Local Environmental Plan Amendment (Major Infrastructure Corridors—Maps) 2020	550m	North West
E2	Environmental Conservation		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/06/2020	11/06/2020	11/06/2020	State Environmental Planning Policy (Western Sydney Employment Area) Amendment 2020	566m	North East
ENZ	Environment and Recreation		State Environmental Planning Policy (Western Sydney Aerotropolis) 2020	11/09/2020	01/10/2020	11/09/2020		637m	North West
SP2	Infrastructure	Water Supply System	Penrith Local Environmental Plan 2010	18/12/2020	18/12/2020	18/12/2020	Amendment No 33	637m	North West
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	18/12/2020	18/12/2020	18/12/2020	Amendment No 33	685m	North
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	18/12/2020	18/12/2020	18/12/2020	Amendment No 33	726m	North
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	02/10/2020	02/10/2020	18/12/2020	Local Environmental Plan Amendment (Major Infrastructure Corridors—Maps) 2020	757m	West
IN1	General Industrial		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/06/2020	11/06/2020	11/06/2020	State Environmental Planning Policy (Western Sydney Employment Area) Amendment 2020	780m	North
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	18/12/2020		801m	South West
RE2	Private Recreation		Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	18/12/2020	Amendment No 23	828m	West
SP2	Infrastructure	Classified Road	Penrith Local Environmental Plan 2010	02/10/2020	02/10/2020	18/12/2020	Local Environmental Plan Amendment (Major Infrastructure Corridors—Maps) 2020	868m	North

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
SP2	Infrastructure	Classified Road	Penrith Local Environmental Plan 2010	11/09/2020	01/10/2020	18/12/2020	State Environmental Planning Policy (Western Sydney Aerotropolis) 2020	868m	North East
SP2	Infrastructure	Water Supply System	Penrith Local Environmental Plan 2010	02/10/2020	02/10/2020	18/12/2020	Local Environmental Plan Amendment (Major Infrastructure Corridors—Maps) 2020	879m	North East
E4	Environmental Living		Penrith Local Environmental Plan 2010	02/10/2020	02/10/2020	18/12/2020	Local Environmental Plan Amendment (Major Infrastructure Corridors—Maps) 2020	908m	West
E2	Environmental Conservation		State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/06/2020	11/06/2020	11/06/2020	State Environmental Planning Policy (Western Sydney Employment Area) Amendment 2020	915m	North East
SP2	Infrastructure	Classified Road	State Environmental Planning Policy (Western Sydney Employment Area) 2009	11/06/2020	11/06/2020	11/06/2020	State Environmental Planning Policy (Western Sydney Employment Area) Amendment 2020	915m	North
IN1	General Industrial		State Environmental Planning Policy (Western Sydney Employment Area) 2009	08/11/2013	08/11/2013	11/06/2020	Blacktown Local Environmental Plan Amendment (Western Sydney Employment Area) 2013	934m	North East
RE2	Private Recreation		Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	18/12/2020	Amendment No 23	986m	West

Environmental Planning Instrument Data Source: NSW Crown Copyright - Planning & Environment

Heritage

707-769 Mamre Road, Kemps Creek, NSW 2178

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch

State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage

Environmental Planning Instrument - Heritage

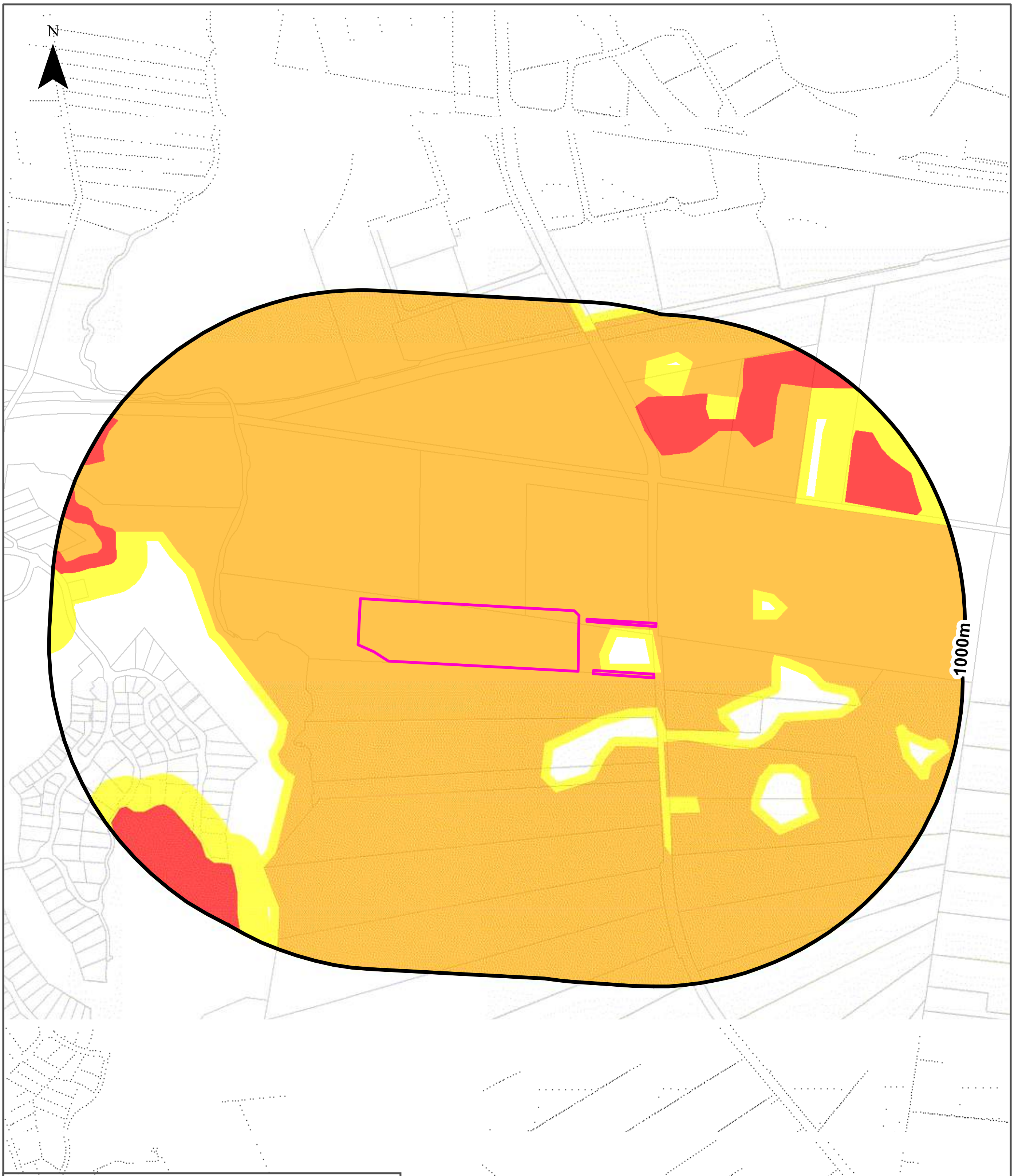
What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
N/A	No records in buffer								

Heritage Data Source: NSW Crown Copyright - Planning & Environment

Natural Hazards - Bush Fire Prone Land

707-769 Mamre Road, Kemps Creek, NSW 2178



Legend

🟪	Site Boundary
⬛	Report Buffer
⬜	Property Boundary

Bush Fire Prone Land Category

🟥	Vegetation Category 1
🟧	Vegetation Category 2
🟧	Vegetation Category 3
🟨	Vegetation Buffer

Scale:

Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2021. Property Boundaries: © Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Natural Hazards

707-769 Mamre Road, Kemps Creek, NSW 2178

Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	0m	Onsite
Vegetation Category 2	0m	Onsite
Vegetation Category 1	543m	North East

Ecological Constraints - Remnant Vegetation of the Cumberland Plain

707-769 Mamre Road, Kemps Creek, NSW 2178

Legend

- ▭ Site Boundary
- ▭ Report Buffer
- ▭ Property Boundary
- ▨ RAMSAR Wetlands

Cumberland Plain Vegetation

- ▨ Crown cover greater than 10%
- ▨ Crown cover less than 10%
- ⁝ Crown cover less than 10% (urban areas)

Scale: 0 100 200 400 600 800 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 12 February 2021

Ecological Constraints

707-769 Mamre Road, Kemps Creek, NSW 2178

Remnant Vegetation of the Cumberland Plain

What remnant vegetation of the Cumberland Plain exists within the dataset buffer?

Description	Crown Cover	Distance	Direction
10 - Shale Plains Woodland	Crown cover greater than 10%	0m	Onsite
10 - Shale Plains Woodland	Crown cover less than 10%	53m	North West
11 - Alluvial Woodland	Crown cover less than 10%	140m	South West
9 - Shale Hills Woodland	Crown cover less than 10%	392m	East
11 - Alluvial Woodland	Crown cover greater than 10%	415m	West

Remnant Vegetation of the Cumberland Plain : NSW Office of Environment and Heritage

Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Environment

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

707-769 Mamre Road, Kemps Creek, NSW 2178

Legend

- ☐ Site Boundary
- ☐ Report Buffer
- ☐ Property Boundaries
- 🟥 High potential GDE - from national assessment
- ▨ High potential GDE - from regional studies
- 🟧 Moderate potential GDE - from national assessment
- ▨ Moderate potential GDE - from regional studies
- 🟦 Low potential GDE - from national assessment
- ▨ Low potential GDE - from regional studies
- ▨ Known GDE - from regional studies
- 🟪 Unclassified potential GDE - from national assessment
- ▨ Unclassified potential GDE - from regional studies

Scale:
0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Ecological Constraints

707-769 Mamre Road, Kemps Creek, NSW 2178

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	Low potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	0m
Aquatic	High potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	River		218m
Terrestrial	High potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	412m
Terrestrial	Moderate potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	661m

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

707-769 Mamre Road, Kemps Creek, NSW 2178

Scale:

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 February 2021

Ecological Constraints

707-769 Mamre Road, Kemps Creek, NSW 2178

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	9	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	0m
Aquatic	10	Undulating to low hilly country, mainly on shale.	River		218m
Aquatic	9	Undulating to low hilly country, mainly on shale.	River		220m
Terrestrial	10	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	514m
Terrestrial	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	572m
Terrestrial	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	964m

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

Ecological Constraints

707-769 Mamre Road, Kemps Creek, NSW 2178

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus banksii samueli	Red-tailed Black-Cockatoo (inland subspecies)	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Certhionyx variegatus	Pied Honeyeater	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Oxyura australis	Blue-billed Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pezoporus wallicus wallicus	Eastern Ground Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stictonetta naevosa	Freckled Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Thinornis rubricollis	Hooded Plover	Critically Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Todiramphus chloris	Collared Kingfisher	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Gastropoda	Meridolum corneovirens	Cumberland Plain Land Snail	Endangered	Not Sensitive	Not Listed	
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Acacia pubescens	Downy Wattle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Allocasuarina glareicola		Endangered	Not Sensitive	Endangered	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Vulnerable	Category 3	Not Listed	
Plantae	Flora	Cynanchum elegans	White-flowered Wax Plant	Endangered	Not Sensitive	Endangered	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Dillwynia tenuifolia		Endangered Population, Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Dillwynia tenuifolia		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Isotoma fluviatilis subsp. fluviatilis		Not Listed	Not Sensitive	Extinct	
Plantae	Flora	Macadamia integrifolia	Macadamia Nut	Not Listed	Not Sensitive	Vulnerable	
Plantae	Flora	Marsdenia viridiflora subsp. viridiflora	Native Pear	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Persoonia nutans	Nodding Geebung	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pimelea curviflora var. curviflora		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Pimelea spicata	Spiked Rice-flower	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pterostylis saxicola	Sydney Plains Greenhood	Endangered	Category 2	Endangered	
Plantae	Flora	Pultenaea parviflora		Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Senna acclinis	Rainforest Cassia	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Not Sensitive	Vulnerable	

Data does not include NSW category 1 sensitive species.
NSW BioNet: © State of NSW and Office of Environment and Heritage

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LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
General area or suburb match	Georeferenced with the confidence of the general/approximate area
Road match	Georeferenced to the road or rail
Road intersection	Georeferenced to the road intersection
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site
Network of features	Georeferenced to a network of features

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Appendix B

Borelogs and PID Measurements

ARUP

NON-CORED BOREHOLE RECORD

ABH-A1

SHEET 1 OF 2

CLIENT Confidential
PROJECT Kemps Creek

LOGGED BY KL
CHECKED BY PC
DRILLED DATE 12-Jan-21

CONTRACTOR BG Drilling
DRILL MODEL D&B-D8
DRILLER Alista
LOCATION 769 Mamre Road,

ANGLE Vertical
BEARING -
HOLE DIAMETER 100mm
MOUNT Track

GROUND LEVEL RL 36.41mAHD
LOCATION 294110.3 E 6253871.5 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

DRILLING				STRATA				MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m		0.30 (36.11)		Silty CLAY: low to medium plasticity, dark brown, trace rootlets			TOP SOIL 0.00: PID = 0 ppm
				0.50m SPT 330mm E 1.00m SPT 400mm E	2;2,3 N=5 1;1,2 N=3	1.50 (34.91)	CL-CI	Silty CLAY: low to medium plasticity, brown 1.00-1.50: Becomes brown mottled red and slight grey	w < PL	F S	RESIDUAL SOIL 0.50: PID = 0 ppm 1.00: PID = 0.2 ppm
			▽ 12/01/2021	1.50m SPT 420mm E 1.95m	4;6,9 N=15	3.00 (33.41)	CL	Silty CLAY: low plasticity, brown, with medium grained sand 1.64-3.00: Becomes dark grey, with coarse, sub-angular gravel and fine grained sand		St	1.50: PID = 0.4 ppm
				3.00m SPT 450mm 3.45m 4.50m SPT 450mm 4.95m 6.00m SPT 450mm 6.45m	2;3,6 N=9 4;7,8 N=15 18;19,15 N=34	7.50 (28.91)	CL	Sandy silty CLAY: low plasticity, grey mottled yellow-brown, fine grained sand 4.50-6.40: Sand becomes fine to coarse grained 6.40-7.50: Sand becomes fine grained, with sub-angular, fine to medium gravel	w > PL w < PL	F - St St VSt	
				7.50m SPT 450mm 7.95m	15;17,23 N=40		CL-CI	Silty CLAY: low to medium plasticity, dark brown mottled grey, with fine to coarse grained sand, with sub-angular fine gravel			

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A1

SHEET 2
OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.41mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294110.3 E 6253871.5 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA				MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E					CL-CI	Silty CLAY: low to medium plasticity, dark brown mottled grey, with fine to coarse grained sand, with sub-angular fine gravel *(continued)*	w < PL	VSt	RESIDUAL SOIL
				9.00m SPT 270mm 9.37m	23;35/120 N>50*	9.00 *(27.41)*	CI	EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, medium plasticity, dark grey		H	
						10.50 *(25.91)*		End of borehole completed at 10.5m Termination: Target depth Groundwater: Encountered			

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NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A2

SHEET 1

OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.41mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294286.8 E 6253859.2 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING: DRILLING & CASING: AD/T (0.00–8.00); WATER; DRILLING PENETRATION: E; GROUNDWATER LEVELS

SAMPLES	FIELD TESTS
E 0.10m	
0.50m SPT 420mm E 1.00m	3;5,8 N=13
1.00m SPT 390mm E 1.50m	1;3,6 N=9
1.50m SPT 450mm E 1.95m	3;8,11 N=19
3.00m SPT 450mm 3.45m	4;5,8 N=13
4.50m SPT 450mm 4.95m	18;19,21 N=40
6.00m SPT 450mm 6.45m	9;11,17 N=28
7.50m SPT 450mm 7.95m	4;7,10 N=17

DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
0.00–0.30 (36.11)		Silty CLAY: with rootlets			TOP SOIL 0.00: PID = 0.3 ppm
0.30–3.00 (33.41)	CI	Silty CLAY: medium plasticity, pale red-brown mottled grey 1.03-1.50: Becomes grey mottled red and orange 1.56-3.00: Becomes grey mottled pale orange	w < PL	St (0.30–1.50) VSt (1.50–3.00)	RESIDUAL SOIL 0.50: PID = 0.4 ppm 1.00: PID = 0.5 ppm 1.50: PID = 0.5 ppm
3.00–6.10 (30.31)	CL-CI	Sandy silty CLAY: low to medium plasticity, mottled grey-yellow-brown, fine to medium grained sand 4.75-6.10: With red-brown fine to medium sub-angular ironstone gravel	w < PL	St to VSt (3.00–4.50) H (4.50–6.00)	
6.10–7.50 (28.91)	CI	Silty CLAY: medium plasticity, yellow-brown mottled grey, with fine to medium grained sand	w < PL	VSt	
7.50–	CI	Silty CLAY: medium plasticity, brown mottled grey, with fine to coarse grained sand, trace sub-angular fine gravel	w > PL	VSt	

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A2

SHEET 2
OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.41mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294286.8 E 6253859.2 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E					CI		Silty CLAY: medium plasticity, brown mottled grey, with fine to coarse grained sand, trace sub-angular fine gravel *(continued)*	w > PL	VSt	RESIDUAL SOIL
				9.00m SPT 220mm 9.32m	25;35/70 N>50*	9 9.00 *(27.41)* 10	CI		EXTREMELY WEATHERED SILTSTONE: recovered as clay, medium plasticity, dark grey		H	
						10.50 *(25.91)* 11 12 13 14 15 16			End of borehole completed at 10.5m Termination: Target depth Groundwater: Not Encountered			

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A3

SHEET 1
OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.70mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293942.2 E 6253789.4 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING: DRILLING & CASING: AD/T (0.00–8.00m); DRILLING PENETRATION: E; GROUNDWATER LEVELS: ▽ 11/01/2021 (at approx. 4.0m)

DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	MATERIAL DESCRIPTION SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	OBSERVATION Comments / Penetration Rate
0.00–0.30 (36.40)		Silty CLAY: with rootlets			TOP SOIL 0.00: PID = 0.3 ppm
0.30–1.00 (35.70)	CL	Silty CLAY: low plasticity, pale brown mottled grey/orange, with fine grained sand	w < PL	St	RESIDUAL SOIL 0.50: PID = 0.1 ppm
1.00–3.00 (33.70)	CL-CI	Silty CLAY: low to medium plasticity, grey mottled red	w < PL	St (to 1.50) VSt	1.00: PID = 0.2 ppm 1.50: PID = 0.2 ppm
3.00–4.50 (32.20)	CL	Silty CLAY: low plasticity, dark red mottled orange and grey, with fine grained sand 3.34-4.50: Becomes grey mottled orange	w < PL	VSt	
4.50–	CL-CI	Sandy silty CLAY: low plasticity, grey, fine grained sand 6.30-7.50: Becomes brown mottled dark brown, with medium sub-angular gravel 7.50-9.30: Becomes mottled yellow-brown and grey	w < PL (to 7.50) w > PL	St - VSt (to 6.30) H (6.30–7.50) St - VSt	

SAMPLES	FIELD TESTS
E 0.10m	
0.50m SPT 400mm E 1.00m	4;5,9 N=14
1.00m SPT 400mm E 1.50m	2;9,5 N=14
1.50m SPT 480mm E 1.95m	2;3,7 N=10
3.00m SPT 460mm 3.45m	5;7,9 N=16
4.50m SPT 490mm 4.95m	5;11,13 N=24
6.00m SPT 450mm 6.45m	16;19,24 N=43
7.50m SPT 450mm 7.95m	6;9,12 N=21

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
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ARUP

NON-CORED BOREHOLE RECORD

ABH-A3

SHEET 2
OF 2

CLIENT Confidential
PROJECT Kemps Creek

LOGGED BY KL
CHECKED BY PC
DRILLED DATE 11-Jan-21

CONTRACTOR BG Drilling
DRILL MODEL D&B-D8
DRILLER Alista
LOCATION 769 Mamre Road,

ANGLE Vertical
BEARING -
HOLE DIAMETER 100mm
MOUNT Track

GROUND LEVEL RL 36.70mAHD
LOCATION 293942.2 E 6253789.4 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
									Sandy silty CLAY: low plasticity, grey, fine grained sand *(continued)*		St - VSt	RESIDUAL SOIL
				9.00m SPT 9.45m	7;12,23 N=35	9	CL-CI		9.30-10.50: Becomes brown mottled dark brown	w > PL		
AD/T		E		10.00m SPT 200mm 10.43m	16;35/280 N=38*	10						
						10.50 *(26.20)*			EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, medium to high plasticity, pale yellow-brown		H	
						11	CI-CH			w < PL		
						12 12.00 *(24.70)*			End of borehole completed at 12m Termination: Target depth Groundwater: Encountered			
						13						
						14						
						15						
						16						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A4

SHEET 1 OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.78mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294114.3 E 6253795.3 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING: DRILLING & CASING: AD/T (0.00–8.00 m); DRILLING PENETRATION: E

SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
E 0.10m				Silty CLAY: low to medium plasticity, dark brown, trace rootlets			TOP SOIL 0.00: PID = 0.1 ppm
0.50m SPT 430mm E	6;6,6 N=12	0.30 (36.48)	CL-CI	Silty CLAY: dark brown mottled red brown 0.83-1.00: Becomes brown		St	RESIDUAL SOIL 0.50: PID = 0.3 ppm
1.00m SPT 450mm E	3;5,9 N=14	1.00 (35.78)	CL	Silty CLAY: low plasticity, pale orange-brown mottled red-brown, with fine grained sand	w < PL		1.00: PID = 0.3 ppm
1.50m SPT 450mm E	5;10,16 N=26					VSt	1.50: PID = 0.2 ppm
1.95m							
3.00m SPT 450mm	8;10,15 N=25	3.00 (33.78)	CL-CI	Sandy silty CLAY: low to medium plasticity, mottled grey and orange-brown, fine grained sand			
3.45m							
4.50m SPT 450mm	8;10,12 N=22				w ~ PL	St - VSt	
4.95m							
6.00m SPT 450mm	8;12,25 N=37			6.00-7.50: Becoming brown, mottled grey		H	
6.45m							
7.50m SPT 450mm	10;19,24 N=43			7.50-7.55: Becomes brown mottled red, trace of sub-angular fine gravel 7.55-9.00: Becomes grey mottled brown			
7.95m		8					

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A4

SHEET 2
OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.78mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294114.3 E 6253795.3 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
ADT		E		9.00m		9 9.00 (27.78)	CL-CI		Sandy silty CLAY: low to medium plasticity, mottled grey and orange-brown, fine grained sand *(continued)*	w ~ PL	H	RESIDUAL SOIL
				SPT 250mm 9.25m	23;35/100 N>50*	9.25 (27.53)	CI		EXTREMELY WEATHERED SHALE: recovered as silty clay, medium plasticity, grey mottled brown			
									Borehole continued to a depth of 18.0m by augering, no samples were taken and no change in drilling resistance was observed.			

10

11

12

13

14

15

16

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A5

SHEET 1
OF 2

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	08-Jan-21 to 11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.68mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294281.0 E 6253777.1 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m				Silty CLAY: high plasticity, dark brown, with sand, trace rootlets	w ~ PL		TOP SOIL
				0.50m SPT 380mm E	6;8,7 N=15						0.50: PID = 0 ppm
						0.60 (36.08)	CI-CH	Silty CLAY: medium to high plasticity, brown mottled red, with fine grained sand		VSt	RESIDUAL SOIL
				1.00m SPT 110mm E	3;4,5 N=9						
				1.50m SPT 450mm E	4;6,8 N=14			1.50-2.00: Becomes pale grey mottled red-brown			1.50: PID = 0 ppm
				2.00m SPT 450mm E 2.45m	4;7,9 N=16			2.00-4.50: Becomes yellow-brown mottled grey			2.00: PID = 0 ppm
				3.00m SPT 500mm 3.45m	4;6,9 N=15						
				4.50m SPT 310mm 4.95m	4;7,7 N=14	4.50 (32.18)	CI	Sandy silty CLAY: medium plasticity, pale grey mottled red-brown and yellow-brown, fine to medium grained sand, trace rounded fine to medium ironstone gravel		St - VSt	
				6.00m SPT 310mm 6.45m	7;7,7 N=14						
				7.50m SPT 450mm 7.95m	3;7,12 N=19						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A5

SHEET 2
OF 2

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	08-Jan-21 to 11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.68mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294281.0 E 6253777.1 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E					CI		Sandy silty CLAY: medium plasticity, pale grey mottled red-brown and yellow-brown, fine to medium grained sand, trace rounded fine to medium ironstone gravel *(continued)*	w ~ PL	St - VSt	RESIDUAL SOIL
				9.00m SPT 400mm 9.37m 10.50m SPT 220mm 10.80m	13;63/220 N>50* 5;124/150 N>50*	9.00 *(27.68)*			EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, dark grey, thinly to thickly laminated		H	
						10.80 *(25.88)*			End of borehole completed at 10.8m Termination: Target depth Groundwater: Not Encountered			

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A6

SHEET 1
OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 37.20mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294402.0 E 6253799.4 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m					Silty CLAY: low to medium plasticity, dark brown, trace rootlets			TOP SOIL 0.00: PID = 0.4 ppm
						0.30 (36.90)	CI-CH		Silty CLAY: medium to high plasticity, red-brown mottled pale-brown	w < PL	VSt	RESIDUAL SOIL
				0.50m SPT 360mm E	6;13,16 N=29							0.50: PID = 0.4 ppm
				1.00m SPT 450mm E	6;9,12 N=21	1			1.00: trace black organic content			1.00: PID = 0.2 ppm
				1.50m SPT 340mm E	4;9,12 N=21							1.50: PID = 0.1 ppm
				1.95m		2						
				3.00m SPT 450mm	5;7,11 N=18	3						
						3.21 (33.99)	CL-CI		Silty CLAY: low to medium plasticity, grey mottled yellow-brown, with fine grained sand			
				3.45m								
			▽ 11/01/2021			4						
				4.50m SPT 450mm	5;8,10 N=18				4.50-6.00: becoming brown mottled dark black-brown, trace fine to medium sub-angular ironstone gravel	w ~ PL		
				4.95m		5						
				6.00m SPT 450mm	4;7,8 N=15	6			6.00-7.75: becoming grey mottled yellow-brown		St	
				6.45m								
						7						
				7.50m SPT 400mm	19;60/250 N>50*				7.75-7.85: Sub-angular medium ironstone gravel	w < PL	H	
						7.85 (29.35)	CI					
				7.90m		8						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-A6

SHEET 2

OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 37.20mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294402.0 E 6253799.4 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		9.00m		9 9.00 (28.20)	CI	× ×	EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, medium plasticity, dark grey *(continued)*	w < PL	H	RESIDUAL SOIL
				SPT 230mm 9.23m	10;40/80 N>50*				End of borehole completed at 9m Termination: Target depth Groundwater: Encountered			
						10						
						11						
						12						
						13						
						14						
						15						
						16						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB

277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-C1

SHEET 1

OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	06-Jan-21 to 07-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.55mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293958.1 E 6253894.6 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA				MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m				Silty CLAY: low to medium plasticity, dark brown, trace rootlets			TOP SOIL
						0.30 (36.25)	CL	Silty CLAY: low plasticity, pale orange mottled red, with fine grained sand	w < PL	St	RESIDUAL SOIL
				0.50m SPT 450mm E	2;3,7 N=10						
				1.00m SPT 450mm E	3;4,5 N=9	1		1.00-1.70: Becomes orange mottled pale brown			
				1.50m SPT 450mm E	2;2,4 N=6			1.70-3.00: Becomes pale brown mottled dark brown		F	
				1.95m		2					
			▽ 7/01/2021								
				3.00m SPT 450mm	3;5,8 N=13	3 3.00 (33.55)	CL-CI	Silty CLAY: low to medium plasticity, dark orange-brown mottled dark brown, with fine grained sand 3.20-6.00: Becomes pale brown-grey		St	
				3.45m		4					
				4.50m SPT 450mm	3;11,22 N=33					H	
				4.95m		5					
				6.00m SPT 450mm	11;18,26 N=44	6		6.00-6.20: Becomes brown mottled grey-orange, trace sub-rounded gravel 6.20-7.50: Becomes dark brown mottled black-grey			
				6.45m		7					
				7.50m SPT 450mm	8;14,25 N=39	7.50 (29.05)	CI	Silty CLAY: medium plasticity, grey			
				7.95m		8					

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

NON-CORED BOREHOLE RECORD

ARUP

ABH-C1

SHEET 2
OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	06-Jan-21 to 07-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.55mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293958.1 E 6253894.6 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		9.00m		9	CI		Silty CLAY: medium plasticity, grey *(continued)*	w < PL	H	RESIDUAL SOIL
				SPT 90mm 9.24m	24;40/90 N>50*	9.00 (27.55) 9.24	CI		EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, medium plasticity, dark grey			
									Continued as cored borehole			
						10						
						11						
						12						
						13						
						14						
						15						
						16						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

CORED BOREHOLE RECORD

ABH-C1

SHEET 3 OF 4

CLIENT	Confidential
PROJECT	Kemps Creek
LOGGED BY	KL
CHECKED BY	PC
DRILLED DATE	06-Jan-21 to 07-Jan-21
CONTRACTOR	BG Drilling
DRILL MODEL	D&B-D8
DRILLER	Alista
LOCATION	769 Mamre Road,
ANGLE	Vertical
BEARING	-
HOLE DIAMETER	100mm
MOUNT	Track
GROUND LEVEL	RL 36.55mAHD
LOCATION	293958.1 E 6253894.6 N
ELEVATION DATUM	Australian Height Datum (AHD)
COORDINATE SYSTEM	GDA 1994 MGA Zone 56

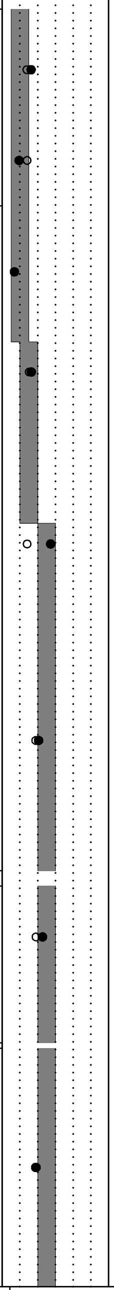
DRILLING | STRATA | MATERIAL DESCRIPTION | DISCONTINUITIES

DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)
HQ3	0	100	92/(92)	0% Water Return
	3	97	97/(95)	0% Water Return
	7	93	93/(69)	0% Water Return
	0	100	97/(97)	20% Water Return

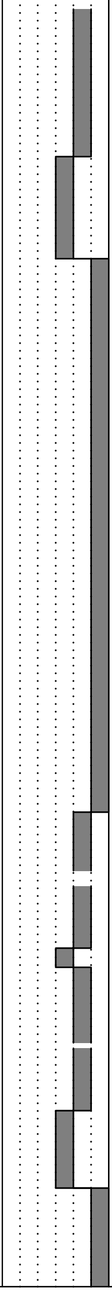
SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	Is 50 (MPa)
	9.24 (27.31)	Continued from borehole		
ABH-C1_09.75		CLAYSTONE, grey, thinly laminated 10.09: Clast of interlaminated sandstone and siltstone	HW	D 0.15 A 0.20 D 0.15 A 0.09
	10.18 (26.37)	SANDSTONE, medium grained, grey, massive		
	10.28 (26.27)	SILTSTONE, grey, thinly to thickly laminated 11.00-11.20: With undulating lamination of sandstone (50%) 11.76-11.96: With undulating lamination of sandstone		A 0.07 D 0.18 A 0.20
	11.96 (24.59)	SANDSTONE, fine grained, grey, thinly laminated	SW	D 0.15 A 0.72
	12.48 (24.07)	SANDSTONE (50%) INTERBEDDED WITH SILTSTONE (50%), fine grained, grey, thickly laminated to very thinly bedded, siltstone is dark grey		
	12.95 (23.60)	SILTSTONE (70%) INTERLAMINATED WITH SANDSTONE (30%), dark grey, thinly to thickly laminated, sandstone is fine grained, grey		D 0.27 A 0.33
	13.56 (22.99)	SANDSTONE, fine grained, dark grey, sub-horizontally thinly laminated		
	13.80	Core Loss: 13.8-13.88m		
	13.88 (22.67)	SANDSTONE, fine grained, grey, sub-horizontally thinly to thickly laminated 14.20-14.42: With siltstone lamination (30%)	SW	D 0.28 A 0.42
	14.42 (22.13)	SILTSTONE (80%) INTERLAMINATED WITH SANDSTONE (20%), dark grey, sub-horizontally thickly laminated, sandstone is medium grained, grey		
	14.71	Core Loss: 14.71-14.74m		
	14.74	SILTSTONE (80%) INTERLAMINATED WITH SANDSTONE (20%), dark grey, sub-horizontally thinly to thickly laminated, sandstone is grey, medium grained		
	15.37 (21.18)	SILTSTONE (90%) INTERBEDDED WITH SANDSTONE (10%), dark grey, thinly to thickly laminated, sandstone is grey, fine grained	SW	D 0.26 A 0.28

● - Axial
○ - Diametral

ESTIMATED ROCK STRENGTH



SPACING (mm)



VISUAL LOG

GENERAL DESCRIPTION

Angle, Shape, Roughness, Infill, Thickness

- 9.44 - 9.54: WE 0° PR RF 100mm
- 10.02 - 10.04: WE 0° PR RF 20mm
- 10.25: BP 0-5° CN UN RF
- 10.56: BP 10° Clay VNR UN S
- 11.57: BP 0-5° CN UN RF
- 13.49: BP 5° CO UN S 2mm clay
- 14.21: BP 0° CN UN RF
- 14.31: BP 0° CN UN RF
- 14.65: BP 10° Sandy Clay CO UN S 2mm
- 15.00: BP 10° Clay VNR UN S
- 15.07: BP 0° Clay VNR UN S
- 15.31 - 15.32: WE 5° PR S 10mm
- 15.48: BP 0° Sandy Clay VNR UN S

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP CORED BOREHOLE RECORD

ABH-C1

SHEET 4
OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	06-Jan-21 to 07-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.55mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293958.1 E 6253894.6 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING					STRATA			MATERIAL DESCRIPTION				DISCONTINUITIES		
DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	● - Axial ○ - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
HQ3	0	100	97/(97)	20% Water Return		17.12 (19.43)	× ×	SILTSTONE (90%) INTERBEDDED WITH SANDSTONE (10%), dark grey, thinly to thickly laminated, sandstone is grey, fine grained *(continued)*	SW	○●	D 0.27 A 0.34 D 0.20 A 0.33			
						17.45 (19.10)	· · ·	SANDSTONE, fine grained, grey, massive		○●	D 0.19 A 0.33			
						17.90 (18.65)	× ×	SILTSTONE, dark grey, thinly laminated						17.79 - 17.82: CR 0-20° UN 30mm
						18.00 (18.55)	· · ·	SANDSTONE, fine grained, grey, massive						
								End of borehole at 18.00m Termination: Target depth						

17
18
19
20
21
22
23
24

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

BOREHOLE PHOTO RECORD

ABH-C1

SHEET 1
OF 1

CLIENT Confidential
PROJECT Kemps Creek

LOGGED BY KL
CHECKED BY
DRILLED DATE 06-Jan-21 to 07-Jan-21

CONTRACTOR BG Drilling
DRILL MODEL D&B-D8
DRILLER Alista
LOCATION 769 Mamre Road,

ANGLE Vertical
BEARING -
HOLE DIAMETER 100mm

GROUND LEVEL RL 36.55mAHD
LOCATION 293958.1 E 6253894.6 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

ABH-C1: 09.24m to 14.00m

ABH-C1: 14.00m to 18.00m

NOTES

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-C2

SHEET 1

OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	06-Jan-21 to 07-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.24mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294184.0 E 6253879.8 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T HW casing		E		E 0.10m		0.20 (36.04)			Silty CLAY: low to medium plasticity, dark brown, trace rootlets			TOP SOIL
				0.50m SPT 450mm E	4;7,8 N=15		CH		Silty CLAY: high plasticity, dark red mottled pale grey, with fine grained sand	w ~ PL	VSt	RESIDUAL SOIL
				1.00m SPT 510mm E	4;6,10 N=16	1						
				1.50m SPT 450mm E	4;6,8 N=14				1.50-3.00: Becomes pale grey mottled pale yellow-brown			
			1/06/2021	2.00m SPT 220mm E	4;5,6 N=11	2				w > PL	St - VSt	
				2.45m								
				3.00m SPT 0mm no recovery	3;3,4 N=7	3					F - St	
				3.50m U75 300mm 3.80m		3.50 (32.74)	CL		Sandy silty CLAY: low plasticity, pale grey mottled pale yellow brown, fine grained sand			
						4						
				4.50m SPT 470mm E	5;9,12 N=21					w ~ PL	VSt	
				4.95m		5						
				6.00m SPT 550mm E	10;17,20 N=37	6 6.00 (30.24)	CI-CH		EXTREMELY WEATHERED BEDROCK: recovered as sandy silty clay, medium to high plasticity, grey and red-brown. sand is fine to medium grained		H	
				6.45m		6.50			Continued as cored borehole			
						7						
						8						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

CORED BOREHOLE RECORD

ABH-C2

SHEET 2
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	06-Jan-21 to 07-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.24mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294184.0 E 6253879.8 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING					STRATA			MATERIAL DESCRIPTION				DISCONTINUITIES		
DRILLING & CASING	CORE LOSS % TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)		SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	● - Axial ○ - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
						1								
						2								
						3								
						4								
						5								
						6		Continued from borehole						
HQ3	82 18	14/(11)	100% Polymer Return (and superfoam)			6.50 (29.74)	⊠	Core Loss: 6.5-8.8m						
						7								
						8								

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
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ARUP — CORED BOREHOLE RECORD

ABH-C2

SHEET 3
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	06-Jan-21 to 07-Jan-21

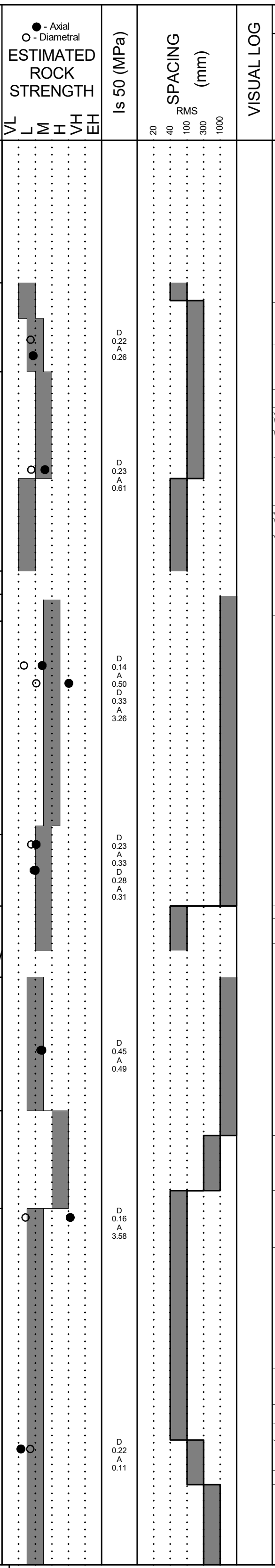
CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.24mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294184.0 E 6253879.8 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING: DRILLING & CASING: HQ3; FLUSH RETURN % (TYPE): 100% Polymer Return (and superfoam)

CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)
82	18	14/(11)
3	97	97/(70)
5	95	80/(80)
0	100	98/(92)

STRATA / MATERIAL DESCRIPTION

DEPTH m	(R.L.) (mAHD)	SAMPLES & FIELD TESTS	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	Is 50 (MPa)
			Core Loss: 6.5-8.8m *(continued)*		
8.80	(27.44)		SANDSTONE, fine grained, green grey, very thinly laminated	HW	D 0.22 A 0.26
				XW and HW	D 0.23 A 0.61
9.90	(26.34)		SILTSTONE, grey interbedded with brown grey, very thinly bedded		
10.42	(25.82)		Core Loss: 10.42-10.56m		
10.56	(25.68)	CORE ABH-C2_10.08	SANDSTONE (80%) INTERBEDDED WITH SILTSTONE (20%), fine grained, pale grey, very thinly laminated, siltstone is dark grey 10.97-11.28: Sandstone (95%) siltstone (5%) thinly bedded	SW FR	D 0.14 A 0.50 D 0.33 A 3.26
11.85	(24.39)		SILTSTONE (90%) INTERBEDDED WITH SANDSTONE (10%), dark grey, thinly laminated, undulating bedding, sandstone is fine grained, pale grey, very tiny laminated	HW XW and HW	D 0.23 A 0.33 D 0.28 A 0.31
12.55	(23.69)		Core Loss: 12.55-12.7m		
12.70	(23.54)		SILTSTONE (90%) INTERBEDDED WITH SANDSTONE (10%), dark grey, thinly laminated, planar bedding, sandstone is fine grained, pale grey, very thinly laminated	MW	D 0.45 A 0.49
13.45	(22.79)		SANDSTONE (80%) INTERBEDDED WITH SILTSTONE (20%), fine grained, pale grey, thinly to thickly laminated, undulating bedding dipping at up to 10°, siltstone is dark grey	SW	
14.00	(22.24)		SILTSTONE (90%) INTERBEDDED WITH SANDSTONE (10%), dark grey, thinly laminated, planar bedding, sandstone is fine grained, pale grey, very thinly laminated 14.22-14.31: Bedding dipping at 10°	MW	D 0.16 A 3.58
15.30	(20.94)		SANDSTONE (90%) INTERBEDDED WITH SILTSTONE (10%), fine grained, pale grey, thinly to thickly laminated, undulating bedding dipping at up to 10°, siltstone is dark grey		D 0.22 A 0.11
15.54	(20.70)		*Description starts on next page*		



DISCONTINUITIES — GENERAL DESCRIPTION: Angle, Shape, Roughness, Infill, Thickness

- 8.91: BP 0° CN
- 9.15: BP 0° CN
- 9.40: BP 0° Clay CO PR RF 2mm
- 9.50: JT 60° Clay VNR PR RF
- 9.53: JT 30° Clay PR S
- 9.56: BP 5° Clay VNR PR S
- 9.63: SM 5° Clay PR 5mm
- 9.78: SM 5° Clay PR 5mm
- 10.05: SM 30° Clay UN 3mm
- 10.09 - 10.10: SM 0° Clay PR 10mm
- 10.12 - 10.13: SM 0° Clay PR 10mm
- 10.21 - 10.23: SM 0° Clay PR 20mm
- 10.67: JT 5° Clay and fine grained gravel PR
- 12.27 - 12.32: WE/CR 0° PR 50mm
- 12.35 - 12.39: WE/CR 0° PR 40mm
- 12.46 - 12.56: WE/CR 0° PR 100mm
- 13.59: BP 0° CO PR RF
- 13.90: BP 0° Clay PR S
- 14.22: JT 15° Clay VNR ST S
- 14.90: BP 0° Clay VNR UN S
- 15.10: SM 0-40° Clay CU RF 4mm
- 15.11 - 15.30: JT 70° CN PR RF multiple spaced at 30mm
- 15.30: BP 0-5° CN UN RF
- 15.47: BP 0° CN PR S
- 15.55: BP 0° CN PR S

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

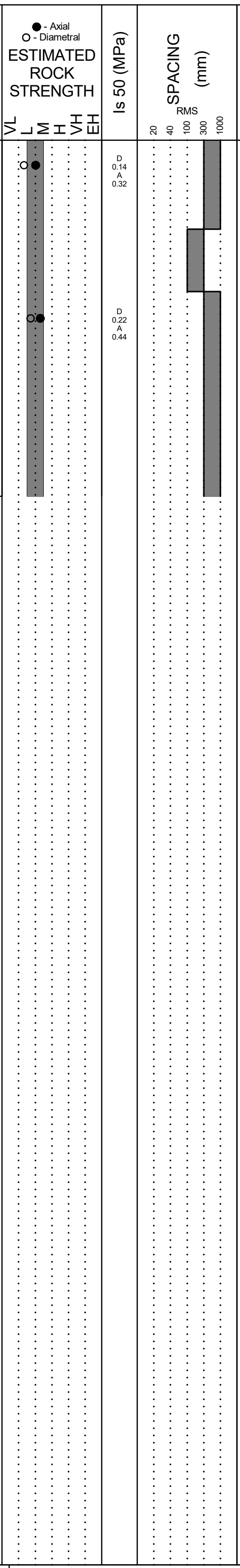
CORED BOREHOLE RECORD

ABH-C2

SHEET 4
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	06-Jan-21 to 07-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.24mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294184.0 E 6253879.8 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56



DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	Is 50 (MPa)	VISUAL LOG	Angle, Shape, Roughness, Infill, Thickness
HQ3	0	100	98/(92)	100% Polymer Return (and superfoam)		17 18 18.00 (18.24)	× ×	SILTSTONE (60%) INTERBEDDED WITH SANDSTONE (40%), dark grey, medium bedded, planar bedding, sandstone is fine grained, pale grey, very thinly laminated *(continued)*	MW	D 0.14 A 0.32 D 0.22 A 0.44		16.50: JT 0° Clay VNR PR S 5mm 16.51: JT 50° CN PR S 16.67: JT 70° CN UN S 16.88: BP 0° CN PR RF 17.57 - 17.60: CR 0-70° UN RF 30mm
						19 20 21 22 23 24		End of borehole at 18.00m Termination: Target depth				

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

BOREHOLE PHOTO RECORD

ABH-C2

SHEET 1

OF 1

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	
		DRILLED DATE	06-Jan-21 to 07-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.24mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294184.0 E 6253879.8 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,			COORDINATE SYSTEM	GDA 1994 MGA Zone 56

ABH-C2: 08.80m to 12.00m

ABH-C2: 12.00m to 18.00m

NOTES

JOB

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ARUP

NON-CORED BOREHOLE RECORD

ABH-C3

SHEET 1
OF 4

CLIENT Confidential
PROJECT Kemps Creek

LOGGED BY LJ
CHECKED BY PC
DRILLED DATE 11-Jan-21 to 12-Jan-21

CONTRACTOR BG Drilling
DRILL MODEL D&B-D8
DRILLER JC
LOCATION 769 Mamre Road,

ANGLE Vertical
BEARING -
HOLE DIAMETER 100mm
MOUNT Track

GROUND LEVEL RL 36.57mAHD
LOCATION 294383.0 E 6253871.2 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T (0.00–7.40) HW casing (0.00–6.00)		E		E 0.10m		0.20 (36.37)		Silty CLAY: high plasticity, dark brown, with silt, trace rootlets	w ~ PL		TOP SOIL 0.00: PID = 0 ppm
				0.50m SPT E 1.00m SPT E 1.50m SPT E 2.00m SPT E 2.55m	3;6,10 N=16 4;7,9 N=16 5;8,12 N=20 4;6,7 N=13	3.00 (33.57)	CI-CH	Silty CLAY: medium to high plasticity, red-brown mottled pale grey, with fine grained sand 1.00-3.00: Becomes brown mottled pale grey		VSt	RESIDUAL SOIL 1.00: PID = 0 ppm 2.00: PID = 0 ppm
				3.00m SPT 3.45m	4;5,6 N=11	4.50 (32.07)	CL-CI	Silty CLAY: low to medium plasticity, mottled brown and pale grey, with fine grained sand		St	
				4.50m SPT 4.95m	9;17,15 N=32	4.90 (31.67)	CI	Gravelly silty CLAY: medium plasticity, red-brown, fine to medium sub-angular ironstone gravel, with fine grained sand		H	
				6.00m SPT 6.45m	7;13,17 N=30	6.50 (30.07)	CI	Silty CLAY: medium plasticity, red-brown mottled pale grey, trace fine to medium sub-angular ironstone gravel			
		F		7.08m SPT 7.40m	21;60/225 N>50*	7.40	CI	EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, medium plasticity, grey, thinly laminated			
								Continued as cored borehole			

NOTES
HQ at 7.40-7.45m overcores SPT sample cavity.
Defects for which infill is not individually described are clean

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

CORED BOREHOLE RECORD

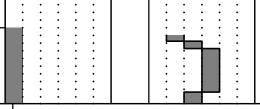
ABH-C3

SHEET 2
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	11-Jan-21 to 12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.57mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294383.0 E 6253871.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA			MATERIAL DESCRIPTION				DISCONTINUITIES		
DRILLING & CASING	CORE LOSS % TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	● - Axial ○ - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
					1								
					2								
					3								
					4								
					5								
					6								
					7								
					7.40 (29.17)		Continued from borehole						
HQ3	0 100	92/(37)	100% Water Return			× ×	SILTSTONE, brown, thinly laminated, rounded medium gravel ironstone inclusion	XW HW					7.64: JT 20° MN VNR PR S 7.67: JT 30° MN VNR PR S 7.71: JT 0-90° CN UN RF 7.94: JT 45° CN PR RF
					8								



NOTES
HQ at 7.40-7.45m overcores SPT sample cavity.
Defects for which infill is not individually described are clean

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

CORED BOREHOLE RECORD

ARUP

ABH-C3

SHEET 3 OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	11-Jan-21 to 12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.57mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294383.0 E 6253871.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING

DRILLING & CASING: HQ3

FLUSH RETURN % (TYPE): 100% Water Return

CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)
0	100	92(37)
2	98	81(80)
7	93	78(43)
4	96	90(79)

STRATA

SAMPLES & FIELD TESTS:
- ABH-C3_08.70 Core
- ABH-C3_11.27 Core
- ABH-C3_13.44 Core
- ABH-C3_15.75 Core

MATERIAL DESCRIPTION

DEPTH m (R.L.) (mAHD)	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING
		HW
8.21 (28.36)	SANDSTONE (90%) INTERBEDDED WITH SILTSTONE (10%), fine grained, pale grey, thinly laminated to very thinly laminated, bedding undulose and dipping at up to 10°, siltstone is dark grey, thinly laminated	MW
9.05 (27.52)	SILTSTONE, grey, thinly bedded	
9.44	Core Loss: 9.44-9.52m	
9.52 (27.05)	SILTSTONE, grey, thinly bedded 10.22-10.30: Rounded coarse gravel inclusions, undulose very thin bedding 11.70-11.92: Thinly laminated pale grey and dark grey	MW MW - SW
11.92 (24.65)	Core Loss: 11.92-12.2m	
12.20 (24.37)	SILTSTONE, grey and dark grey, very thinly bedded	
14.57 (22.00)	SANDSTONE, fine grained, pale grey, thinly to thickly laminated	SW
15.35 (21.22)	Core Loss: 15.35-15.46m	
15.46 (21.11)	SANDSTONE, fine grained, pale grey, thinly to thickly laminated	
15.73 (20.84)	SANDSTONE, fine to medium grained, pale grey, thinly to thickly laminated, dipping at 10°	FR

Depth scale: 9, 10, 11, 12, 13, 14, 15, 16

ESTIMATED ROCK STRENGTH: ● - Axial, O - Diametral; VL L M H VH EH

Is 50 (MPa):
- D 0.18 A 0.54
- D 0.04 A 0.17
- D 0.35 A 0.44
- D 0.13 A 0.11
- D 0.26 A 0.19
- A 0.26
- D 0.65 A 0.85
- D 0.61 A 0.74

DISCONTINUITIES

SPACING (mm) RMS: 20 40 100 200 300 1000

VISUAL LOG

GENERAL DESCRIPTION — Angle, Shape, Roughness, Infill, Thickness

- 8.03: JT 85° Clay CO PR S
- 8.08 - 8.10: WE 0° Clay 20mm grey
- 8.18 - 8.23: SM 0-20° Clay CO PR S 50mm
- 8.22: BP 10° CN PR S
- 8.24: SM 10° PR RF 3mm
- 8.25: SM 0-10° Clay PR S 2mm
- 8.41: BP 10° CN PR RF
- 8.65: BP 0° Silt VNR PR S
- 9.03: BP 0-50° CN PR RF
- 9.06: JT 45° Silt VNR PR S
- 9.21: JT 30° Silt VNR PR RF
- 9.52 - 9.62: WE 0° Clay PR RF 100mm
- 9.86: JT 30° CN PR S
- 9.97 - 9.98: WE 0° PR 10mm
- 10.13: JT 35° CN PR S
- 10.15: BP 0° CN PR RF
- 10.18: BP 10° CN PR RF
- 10.46: 4xJT 70-90° CN UN RF
- 10.59: BP 0-15° CN UN RF
- 10.72: BP 10° CN PR RF
- 10.89: BP 5° CN PR RF
- 10.92: JT 45° CN PR S
- 10.95: BP 10° CN PR RF
- 10.96: JT 70° QZ/CA CO UN S
- 11.16: CR 30° UN RF
- 11.45: BP 0° CN PR RF
- 11.54: BP 0° CN PR RF
- 11.63: JT 15° CN PR S
- 11.71: WE 0° PR S
- 12.36: JT 15° CN ST S
- 12.39: JT 30° CN ST S
- 12.43: BP 0° CN PR RF
- 12.56: JT 45° CN PR S
- 12.67: JT 30° CN ST S
- 12.74: BP 0° CN PR RF
- 12.78: CR 0-20° UN RF 5mm
- 13.15 - 13.21: WE 0° Grey clay 60mm
- 13.23: BP 0° CN PR S
- 13.25: BP 20° CN PR RF
- 13.37: BP 0-10° CN UN RF
- 13.45: WE 0-10° UN RF 10mm
- 13.72: BP 0-10° CN UN RF
- 13.89: BP 0-5° CN UN RF
- 13.92: JT 80° CN UN RF
- 13.93 - 13.97: WE 0° PR RF 40mm
- 14.00 - 14.40: JT 0-30° CN UN multiple incipient joints at 50mm spacing
- 14.40: BP 10° CN PR RF
- 14.42: BP 0° CN PR RF
- 14.48: BP 0° CN PR RF
- 14.53: BP 0-5° CN UN RF
- 15.52: BP 0° CN PR RF
- 15.53: JT 45° CN PR S
- 15.62: JT 45° CN PR S
- 15.66: JT 45° CN PR S
- 15.68: JT 20° CN PR S
- 15.69 - 15.75: JT 90° QZ/CA CO UN 1mm healed

NOTES
HQ at 7.40-7.45m overcores SPT sample cavity.
Defects for which infill is not individually described are clean

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

CORED BOREHOLE RECORD

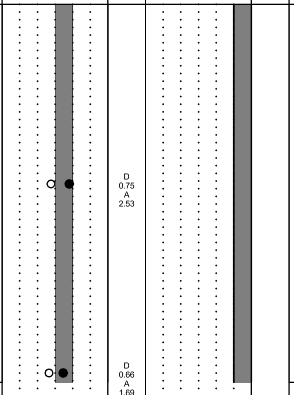
ABH-C3

SHEET 4
OF 4

CLIENT	Confidential	LOGGED BY	LJ
		CHECKED BY	PC
PROJECT	Kemps Creek	DRILLED DATE	11-Jan-21 to 12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.57mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294383.0 E 6253871.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING					STRATA			MATERIAL DESCRIPTION				DISCONTINUITIES		
DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	● - Axial O - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
HQ3	4	96	90/(79)	100% Water Return		17		SANDSTONE, fine to medium grained, pale grey, thinly to thickly laminated, dipping at 10° *(continued)*	FR		D 0.75 A 2.53			
						18 18.00 (18.57)					D 0.66 A 1.69			
								End of borehole at 18.00m Termination: Target depth						
						19								
						20								
						21								
						22								
						23								
						24								



NOTES
HQ at 7.40-7.45m overcores SPT sample cavity.
Defects for which infill is not individually described are clean

See explanatory notes for details of abbreviations and basis of descriptions

JOB
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ARUP

BOREHOLE PHOTO RECORD

ABH-C3

SHEET 1

OF 1

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	
		DRILLED DATE	11-Jan-21 to 12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.57mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294383.0 E 6253871.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,			COORDINATE SYSTEM	GDA 1994 MGA Zone 56

ABH-C3: 07.40m to 12.00m

ABH-C3: 12.00m to 18.00m

NOTES
HQ at 7.40-7.45m overcores SPT sample cavity.
Defects for which infill is not individually described are clean

JOB
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ARUP

NON-CORED BOREHOLE RECORD

ABH-C4

SHEET 1
OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	07-Jan-21 to 08-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.68mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293792.9 E 6253838.0 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m		0.30 (36.38)			Silty CLAY: low to medium plasticity, dark brown, with fine grained sand, trace rootlets			TOP SOIL
				0.50m SPT 450mm E 1.00m SPT 450mm E 1.50m SPT 450mm E 1.95m	5;7,7 N=14 2;3,6 N=9 4;6,10 N=16	3.00 (33.68)	CL		Silty CLAY: low plasticity, pale orange-brown, with fine grained sand 1.00-3.00: Becoming orange mottled dark brown	w < PL	St VSt	RESIDUAL SOIL
				3.00m SPT 450mm 3.45m 4.50m SPT 450mm 4.95m	8;10,11 N=21 6;10,25 N=35	6.00 (30.68)	CL		Sandy silty CLAY: low plasticity, mottled pale grey and orange, fine grained sand 4.94-6.00: Becomes orange-grey mottled red, trace angular medium ironstone gravel	w ~ PL w < PL	VSt	
				6.00m SPT 450mm 6.45m	11;17,27 N=44	7.50 (29.18)	CI		Silty CLAY: medium plasticity, pale orange-grey, with fine grained sand	w < PL	St - VSt	
				7.50m SPT 450mm 7.95m	12;17,24 N=41	8	CL		Gravelly silty CLAY: low plasticity, mottled orange-brown and grey, fine to medium sub-angular ironstone gravel, with fine to coarse grained sand		H	

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

CORED BOREHOLE RECORD

ABH-C4

SHEET 3
OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	07-Jan-21 to 08-Jan-21
CONTRACTOR	BG Drilling	GROUND LEVEL	RL 36.68mAHD
DRILL MODEL	D&B-D8	LOCATION	293792.9 E 6253838.0 N
DRILLER	Alista	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	COORDINATE SYSTEM	GDA 1994 MGA Zone 56
ANGLE	Vertical		
BEARING	-		
HOLE DIAMETER	100mm		
MOUNT	Track		

DRILLING

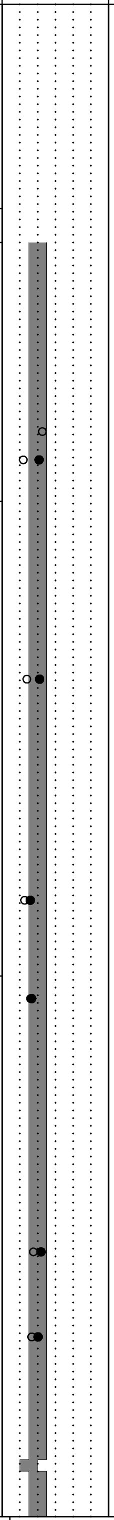
DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)
HQ3	0	100	99/(91)	95% Water Return
	0	100	100/(99)	100% Water Return
	0	100	100/(95)	100% Water Return

STRATA / MATERIAL DESCRIPTION

SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING
	9.08 (27.60)	Continued from borehole SANDSTONE (95%) INTERBEDDED WITH SILTSTONE (5%), fine grained, brownish grey, thinly to thickly laminated	XW
ABH-C4_10.00 Core	9.56 (27.12)	SILTSTONE, grey with pale brown staining, sub-horizontally bedded 9.82-10.26: Bedding becomes indistinctive	HW
	10.26 (26.42)	SANDSTONE (60%) INTERBEDDED WITH SILTSTONE (40%), fine grained, grey, very thinly bedded, siltstone is dark grey	
	10.63 (26.05)	SANDSTONE (80%) INTERLAMINATED WITH SILTSTONE (20%), fine grained, grey, thinly laminated, siltstone is dark grey	MW
	11.38 (25.30)	SILTSTONE, grey, thinly laminated	
	11.62 (25.06)	CLAYSTONE, dark grey-black, massive	
ABH-C4_12.02 Core	12.02 (24.66)	SILTSTONE, grey, thinly laminated	
	12.61 (24.07)	SANDSTONE, fine grained, grey, thinly laminated	
	13.14 (23.54)	SILTSTONE, grey, massive	SW
	13.54 (23.14)	SILTSTONE (50%) INTERBEDDED WITH SANDSTONE (50%), dark grey, thickly laminated to very thinly bedded, sandstone is fine grained, grey	
	13.92 (22.76)	SILTSTONE (90%) INTERBEDDED WITH SANDSTONE (10%), dark grey, very thinly laminated, sandstone is fine grained, grey	
	15.10 (21.58)	SANDSTONE (75%) INTERBEDDED WITH SILTSTONE (25%), fine grained, grey, sub-horizontally bedded, siltstone is dark grey	

ESTIMATED ROCK STRENGTH

● - Axial
○ - Diametral

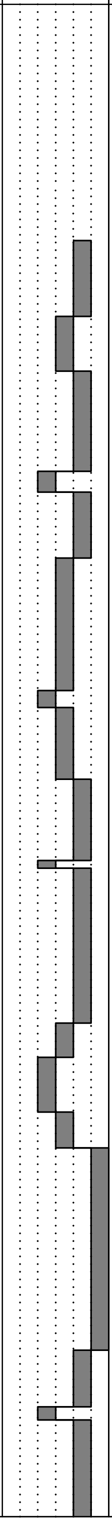


Is 50 (MPa)

D 0.42
D 0.12 A 0.34
D 0.15 A 0.35
D 0.13 A 0.19
D 0.19 A 0.21
D 0.23 A 0.39
D 0.21 A 0.32

DISCONTINUITIES

SPACING (mm)



VISUAL LOG

GENERAL DESCRIPTION
Angle, Shape, Roughness, Infill, Thickness

- 9.25: BP 0° CN PR RF
- 9.58: BP 0° CN PR RF
- 9.65 - 9.67: SM 0° Clay 20mm
- 9.82: BP 0-5° Clay CO UN RF 1mm
- 9.94: JT 20° VNR UN S
- 10.47: BP 5° Sandy Clay CO UN S 1mm
- 10.53 - 10.56: SM 0° Sandy Clay PR RF 30mm
- 10.58: BP 5° Sandy Clay CO UN S
- 10.93: BP 5° Sandy Clay CO UN S 1mm
- 11.16: JT 15° CN UN RF
- 11.44: BP 5° Sandy Clay VNR UN S
- 11.63: BP 10° Sandy Clay CO UN S 1mm
- 11.72: JT 5° Sandy Clay VNR UN S
- 11.94 - 12.00: WE 0° Sandy Clay PR S 62mm
- 12.10: BP 15° Sandy Clay CO UN S 2mm
- 12.53: BP 10° Sandy Clay VNR UN S
- 12.57: BP 10° Sandy Clay CO UN S 1mm
- 12.94: BP 15° Sandy Clay CO UN S 2mm
- 13.39: BP 0° CN
- 13.57: JT 15-90° CN UN S
- 13.68: BP 0° CN PR RF
- 13.75: JT 80-90° CN UN RF
- 13.80: BP 0-10° CN UN RF
- 13.86: BP 0° CN PR RF
- 14.05: BP 0-50° Clay VNR UN S
- 15.12: BP 0° Clay VNR UN S
- 15.42: BP 0° Clay VNR
- 15.49: BP 5° Sandy Clay CO UN S
- 15.79: JT 90° CN PR S

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

CORED BOREHOLE RECORD

ABH-C4

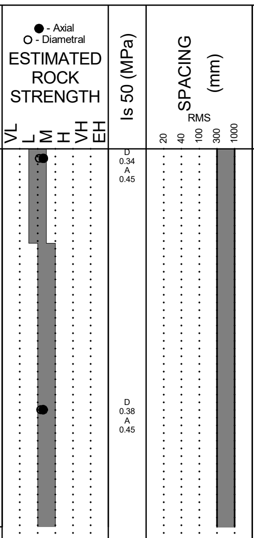
SHEET 4

OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	07-Jan-21 to 08-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.68mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293792.9 E 6253838.0 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING					STRATA			MATERIAL DESCRIPTION			
DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	Is 50 (MPa)	VISUAL LOG
HQ3	0	100	100/(95)	100% Water Return	ABH-C4_16.25 Core		· · ·	SANDSTONE (75%) INTERBEDDED WITH SILTSTONE (25%), fine grained, grey, sub-horizontally bedded, siltstone is dark grey *(continued)*	SW	D 0.34 A 0.45	
						16.82 (19.86)	× ×	SILTSTONE, dark grey, sub-horizontally bedded		D 0.38 A 0.45	
						17.59 (19.09)	× ×	SILTSTONE (80%) INTERBEDDED WITH SANDSTONE (20%), grey, thickly laminated to very thinly bedded, sandstone is fine grained, dark grey			
						18.00 (18.68)		End of borehole at 18.00m Termination: Target depth			



DISCONTINUITIES

GENERAL DESCRIPTION

Angle, Shape, Roughness, Infill, Thickness

- 16.50: BP 0° CN PR RF
- 17.03: BP 0° CN PR RF
- 17.97: BP 0° CN

Depth scale: 17, 18, 19, 20, 21, 22, 23, 24

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

BOREHOLE PHOTO RECORD

ABH-C4

SHEET 1

OF 1

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	
		DRILLED DATE	07-Jan-21 to 08-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.68mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293792.9 E 6253838.0 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,			COORDINATE SYSTEM	GDA 1994 MGA Zone 56

ABH-C4: 09.08m to 14.00m

ABH-C4: 14.00m to 18.00m

NOTES

JOB

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ARUP

NON-CORED BOREHOLE RECORD

ABH-C5

SHEET 1
OF 3

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 06-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.45mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293835.8 E 6253743.9 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E							Silty CLAY: low to medium plasticity, dark brown, trace rootlets	w < PL		TOP SOIL
				0.50m SPT 380mm	8;12,16 N=28	0.30 (36.15)	CI-CH		Silty CLAY: medium to high plasticity, brown, with fine grained sand		VSt	RESIDUAL SOIL
				1.50m SPT 450mm	6;10,10 N=20				1.50-3.00: Becomes dark brown		St - VSt	
			5/01/2021	3.00m SPT 450mm 3.45m	7;9,10 N=19				3.00-4.50: Becomes dark brown mottled black-grey			
				4.50m SPT 450mm 4.95m	18;20,21 N=41	4.50 (31.95)	CI		Sandy silty CLAY: medium plasticity, brown mottled grey-orange and black, fine to medium grained sand, with fine to medium angular ironstone gravel		VSt	
				6.00m SPT 450mm 6.45m	8;16,25 N=41				6.00-7.50: Becomes brown mottled grey-red			
				7.50m SPT 280mm 7.78m	17;35/130 N>50*	7.50 (28.95)	CI		EXTREMELY WEATHERED BEDROCK: recovered as silty clay, medium plasticity, pale brown mottled grey		H	
						7.78			Continued as cored borehole			

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
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ARUP CORED BOREHOLE RECORD

ABH-C5

SHEET 2
OF 3

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 06-Jan-21
CONTRACTOR	BG Drilling	GROUND LEVEL	RL 36.45mAHD
DRILL MODEL	D&B-D8	LOCATION	293835.8 E 6253743.9 N
DRILLER	Alista	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	COORDINATE SYSTEM	GDA 1994 MGA Zone 56
ANGLE	Vertical		
BEARING	-		
HOLE DIAMETER	100mm		
MOUNT	Track		

DRILLING				STRATA			MATERIAL DESCRIPTION				DISCONTINUITIES		
DRILLING & CASING	CORE LOSS % TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	● - Axial O - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
					7.78		Continued from borehole						
HQ3	0 100	99/(99)			7.80	× ×	EXTREMELY WEATHERED BEDROCK, recovered as medium plasticity pale brown mottled grey silty	XW HW					7.92: BP 5° Clay VNR PR S

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

CORED BOREHOLE RECORD

ABH-C5

SHEET 3 OF 3

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 06-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.45mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293835.8 E 6253743.9 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING

DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS
HQ3	0	100	99(99)	100% Water Return	
	6	94	82(78)	20% Water Return	ABH-C5_10.41 Core
	0	100	89(86)	20% Water Return	
	3	97	90(87)	0% Water Return	

STRATA / MATERIAL DESCRIPTION

DEPTH (R.L.) m (mAHD)	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING
	clay SILTSTONE (90%) INTERLAMINATED WITH SANDSTONE (10%), grey brown, sub-horizontally thinly laminated, sandstone is fine grained, grey *(continued)* 8.35-9:00: Iron staining	HW MW
9.40	Core Loss: 9.4-9.49m	
9.49 (26.96)	SILTSTONE (90%) INTERLAMINATED WITH SANDSTONE (10%), grey, sub-horizontally thinly laminated, sandstone is fine grained, grey	
10.00 (26.45)	SANDSTONE, fine grained, dark grey, massive	
10.25 (26.20)	SILTSTONE (60%) INTERBEDDED WITH SANDSTONE (40%), grey, very thinly bedded, sandstone is fine grained, dark grey	MW
13.00 (23.45)	SANDSTONE (80%) INTERLAMINATED WITH SILTSTONE (20%), fine grained, grey, sub-horizontally thinly laminated, siltstone is dark grey	
13.50 (22.95)	SILTSTONE (50%) INTERBEDDED WITH SANDSTONE (50%), dark grey, sub-horizontally thinly to thickly laminated, sandstone is fine grained, grey	
14.10 (22.35)	CLAYSTONE, grey, massive	
15.43	Core Loss: 15.43-15.53m	
15.53 (20.92)	SILTSTONE, dark grey, sub-horizontally thinly to thickly laminated, with fine grained sandstone laminae	MW

Depth scale: 9, 10, 11, 12, 13, 14, 15, 16

ESTIMATED ROCK STRENGTH: ● - Axial, ○ - Diametral; VL L M H VH EH

Is 50 (MPa):

D 0.07 A 0.04
D 0.06 A 0.16
D 2.92 A 0.34
D 0.11 A 0.15
D 0.18 A 0.33
D 0.07 A 0.15
D 0.52 A 0.29
D 0.81 A 1.17
D 0.14 A 0.40
D 0.18 A 0.17
D 0.13 A 0.12

DISCONTINUITIES

SPACING (mm) RMS: 20 40 100 300 1000

VISUAL LOG

GENERAL DESCRIPTION — Angle, Shape, Roughness, Infill, Thickness

- 8.26 - 8.27: SM 5° 10mm
- 8.55: JT 80-90° VNR CU RF healed
- 9.08: JT 60° VNR PR VNR
- 9.19: JT 0-80° CN UN RF
- 9.35 - 9.40: FZ 50mm
- 9.62 - 9.64: WE 0-30° UN RF 15mm
- 9.68 - 9.71: WE 0-70° UN RF 30mm
- 9.79: JT 40° Sandy Clay VNR UN S
- 9.87 - 9.89: WE 30° Sandy Clay CO UN S 20mm
- 9.94: BP 10° Sandy Clay CO UN S
- 10.04: BP 30° Sandy Clay CO PR RF 3mm
- 10.23: BP 10° CN PR RF
- 10.25: WE 10° RF
- 10.79: JT 0-30° CN UN S
- 10.82: JT 0-30° CN UN S
- 11.00: JT 50-60° CN UN RF
- 11.31 - 11.37: WE 0-10° UN S 60mm
- 11.47: BP 0° CO PR RF
- 12.10: JT 0-30° CN UN S
- 12.20 - 12.27: FZ 65mm
- 12.57: SM 5° Sandy Clay PR RF 5mm
- 12.65 - 12.74: WE 0° PR RF 90mm
- 12.86: BP 0-50° CN UN RF
- 13.40: BP 0° CN PR S
- 13.98 - 14.08: WE 0° PR S 100mm
- 14.12: BP 0-5° CN UN RF
- 14.60 - 14.62: SM 0° PR S 15mm
- 14.65: JT 15° CN UN S
- 15.09 - 15.12: WE 0-15° UN RF 30mm
- 15.33: JT 20° CN PR S
- 15.41 - 15.43: CR 20° PR VNR 20mm
- 15.53 - 15.56: CR 0° PR RF 30mm

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

CORED BOREHOLE RECORD

ABH-C5

SHEET 4
OF 3

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 06-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.45mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293835.8 E 6253743.9 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	ESTIMATED ROCK STRENGTH ● - Axial ○ - Diametral VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
HQ3	3	97	90(87)	0% Water Return		17 17.74 (18.71)	× ×	SILTSTONE, dark grey, sub-horizontally thinly to thickly laminated, with fine grained sandstone laminae *(continued)* 16.40: Sandstone clast 20mm dia. 16.85-16.90: Sandstone bed, fine grained, grey	MW	○●	D 0.21 A 0.32 D 0.29 A 0.01			15.97 - 16.00: WE 0-20° ST RF 30mm 16.07: BP 0-10° CN UN RF 16.10 - 16.13: WE 0° PR RF 30mm 16.20: BP 10° CN PR S 2mm 16.94 - 17.09: SM 0-20° Gravelly Clay UN S 150mm 17.66 - 17.67: WE 0-5° UN RF 12mm
						18 19 20 21 22 23 24		End of borehole at 17.74m Termination: Target depth						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

BOREHOLE PHOTO RECORD

ABH-C5

SHEET 1

OF 2

CLIENT Confidential

PROJECT Kemps Creek

LOGGED BY KL

CHECKED BY

DRILLED DATE 05-Jan-21 to 06-Jan-21

CONTRACTOR BG Drilling

DRILL MODEL D&B-D8

DRILLER Alista

LOCATION 769 Mamre Road,

ANGLE Vertical

BEARING -

HOLE DIAMETER 100mm

GROUND LEVEL RL 36.45mAHD

LOCATION 293835.8 E 6253743.9 N

ELEVATION DATUM Australian Height Datum (AHD)

COORDINATE SYSTEM GDA 1994 MGA Zone 56

ABH-C5: 07.78m to 12.00m

ABH-C5: 12.00m to 17.00m

NOTES

JOB

277863

ARUP	**BOREHOLE PHOTO RECORD**	ABH-C5	SHEET 2 OF 2

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	
		DRILLED DATE	05-Jan-21 to 06-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.45mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	293835.8 E 6253743.9 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,			COORDINATE SYSTEM	GDA 1994 MGA Zone 56

ABH-C5: 17.00m to 17.74m

NOTES

JOB 277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-C6

SHEET 1

OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	08-Jan-21 to 11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.52mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294008.1 E 6253733.8 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T				E 0.10m					Silty CLAY: low to medium plasticity, dark brown, with fine grained sand, trace, rootlets			TOP SOIL
						0.30 (36.22)	CL		Silty CLAY: low plasticity, orangey brown mottled grey, with fine grained sand		St	RESIDUAL SOIL
				0.50m SPT 380mm E	3;3,6 N=9							0.50: PID = 0.2 ppm
				1.00m SPT 450mm E	5;7,13 N=20	1.00 (35.52)	CL		Silty CLAY: low plasticity, pale brown-orange mottled grey, with fine grained sand	w < PL	VSt - H	1.00: PID = 0.2 ppm
				1.50m SPT 450mm E	4;9,12 N=21				1.50-3.00: Becomes brown-orange			1.50: PID = 0.3 ppm
				1.95m								
				3.00m SPT 450mm	4;5,7 N=12	3.00 (33.52)	CL		Sandy silty CLAY: low plasticity, orange-grey, fine to medium grained sand		VSt	
				3.50m U75 450mm								
				4.00m								
				4.50m SPT 450mm	4;8,10 N=18	4.50 (32.02)	CL		Silty CLAY: low plasticity, pale grey mottled orange-brown, with fine grained sand	w < PL		
				4.95m								
				6.00m SPT 450mm	11;20,33 N=53				6.25-9.00: Becomes mottled dark orange-brown and grey, with fine to medium sub-angular ironstone gravel		H	
				6.45m								
				7.50m SPT 450mm	8;20,21 N=41							
				7.95m								

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB

277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-C6

SHEET 2

OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	08-Jan-21 to 11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.52mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294008.1 E 6253733.8 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T						9.00 (27.52)	CL		Silty CLAY: low plasticity, pale grey mottled orange-brown, with fine grained sand *(continued)*	w < PL	H	RESIDUAL SOIL
				9.00m SPT 450mm 9.45m 10.00m SPT 200mm 10.23m	10;23,33 N=56 35;35/80 N>50*	10.50 (26.02)	CI		Silty CLAY: medium plasticity, mottled grey and brown, trace fine grained sand	w ~ PL		
				10.70m		10.70	CI		EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, medium plasticity, grey thinly laminated			
									Continued as cored borehole			

Depth scale: 9, 10, 11, 12, 13, 14, 15, 16

NOTES	See explanatory notes for details of abbreviations and basis of descriptions	JOB 277863

ARUP

CORED BOREHOLE RECORD

ABH-C6

SHEET 3
OF 4

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	08-Jan-21 to 11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.52mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294008.1 E 6253733.8 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING — STRATA — MATERIAL DESCRIPTION — DISCONTINUITIES

DRILLING & CASING | CORE LOSS % | TCR % (Drill rate) | SCR % / (RQD %) | FLUSH RETURN % (TYPE) | SAMPLES & FIELD TESTS | DEPTH (R.L.) m (mAHD) | GRAPHIC LOG | ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components | WEATHERING | ● - Axial ○ - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH | Is 50 (MPa) | SPACING (mm) RMS 20 40 100 300 1000 | VISUAL LOG | GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness

Depth scale: 9, 10, 11, 12, 13, 14, 15, 16

DEPTH (R.L.)	ROCK TYPE	WEATHERING
10.70	Continued from borehole	
10.77 (25.75)	EXTREMELY WEATHERED SILTSTONE, recovered as silty clay, medium plasticity, grey	XW
	SILTSTONE, dark grey black, massive	HW
11.22 (25.30)	SANDSTONE, fine grained, grey, sub-horizontally thinly laminated to very thinly bedded	MW
12.14	Core Loss: 12.14-12.18m	
12.18	SANDSTONE (60%) INTERBEDDED WITH SILTSTONE (40%), fine grained, grey, sub-horizontally thinly laminated to very thinly bedded, siltstone is dark grey	
12.53 (23.99)	SILTSTONE, dark grey, very thinly bedded 13.10 - 13.80: Bed of fine grained sandstone	MW
13.60 (22.92)	SANDSTONE, fine grained, dark grey, massive 13.97-14.02: with thickly laminated siltstone	SW
14.02 (22.50)	SILTSTONE, dark grey, very thinly bedded	
15.55 (20.97)	Core Loss: 15.55-15.65m	
15.65 (20.87)	SILTSTONE, dark grey, very thinly bedded	

DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)
HQ3	0	100	98/(98)	95% Water Return
	1	99	98/(92)	95% Water Return
	11	89	88/(88)	100% Water Return

SAMPLES & FIELD TESTS:
- ABH-C6_11.34 Core
- ABH-C6_14.30 Core

Is 50 (MPa):
- D 0.05 A 0.06
- D 0.13 A 0.37
- D 0.77 A 1.42
- D 0.07 A 0.23
- D 0.05 A 0.51
- D 0.33 A 0.51
- D 0.19 A 0.40

GENERAL DESCRIPTION:
- 10.93: BP 5° Sandy Clay CO PR RF 2mm
- 11.05: JT 0-50° CN UN VNR
- 11.17: BP 0° CN PR S
- 11.31: BP 5° CN PR S
- 11.53 - 11.58: JT 45° CN PR VNR 50mm
- 11.67: BP 0° Sandy Clay CO PR S 1mm
- 11.73: BP 0° CN PR S
- 11.74: JT 45° CN PR healed
- 11.86: BP 5° CN PR S
- 11.95: BP 5° CN PR S
- 12.54 - 12.56: WE 0° PR RF 20mm
- 12.61 - 12.63: WE 0° PR RF 15mm
- 13.55: JT 20-45° Sandy Clay CO UN 1mm
- 13.63 - 13.64: WE 0-20° UN RF 10mm
- 13.65: BP 0° CN PR RF
- 14.05: BP 0° CN PR RF
- 14.09 - 14.10: WE 0° decomposed rock PR RF 10mm
- 14.31: BP 0° CN UN
- 14.60: BP 0° CN UN
- 14.90: BP 10° Sandy Clay CO PR RF 1mm
- 15.55: BP 0-5° CN UN RF
- 15.65: BP 0° CN UN RF
- 15.95: BP 0° CN PR RF

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

CORED BOREHOLE RECORD

ABH-C6

SHEET 4
OF 4

CLIENT Confidential
PROJECT Kemps Creek

LOGGED BY KL
CHECKED BY PC
DRILLED DATE 08-Jan-21 to 11-Jan-21

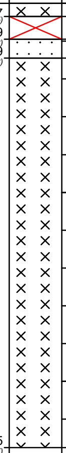
CONTRACTOR BG Drilling
DRILL MODEL D&B-D8
DRILLER Alista
LOCATION 769 Mamre Road,

ANGLE Vertical
BEARING -
HOLE DIAMETER 100mm
MOUNT Track

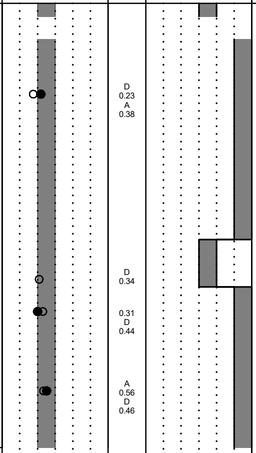
GROUND LEVEL RL 36.52mAHD
LOCATION 294008.1 E 6253733.8 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	Is 50 (MPa)	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
HQ3	11	89	88/(88)	100% Water Return		16.07 (20.45)	Core Loss: 16.07-16.19m	SW		
						16.19 (20.33)	SILTSTONE (50%) INTERBEDDED WITH SANDSTONE (50%), dark grey, very thinly bedded, sandstone is fine grained, grey		D 0.23 A 0.38	
						16.29 (20.23)	SILTSTONE, dark grey, massive			
	0	100	100/(100)	100% Water Return	ABH-C6_17.68 Core	17	17.80-18.35: With thinly to thickly laminated fine grained sandstone (40%)		D 0.34 0.31 D 0.44 A 0.56 D 0.46	17.21: JT 0-25° CN UN RF 17.30: BP 10° CN PR RF
						18.35 (18.17)	End of borehole at 18.35m Termination: Target depth			

GRAPHIC LOG



● - Axial
○ - Diametral



Depth scale: 17, 18, 19, 20, 21, 22, 23, 24

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

BOREHOLE PHOTO RECORD

ABH-C6

SHEET 1

OF 1

CLIENT	Confidential	LOGGED BY	KL
PROJECT	Kemps Creek	CHECKED BY	
		DRILLED DATE	08-Jan-21 to 11-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.52mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294008.1 E 6253733.8 N
DRILLER	Alista	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,			COORDINATE SYSTEM	GDA 1994 MGA Zone 56

ABH-C6: 10.07m to 15.00m

ABH-C6: 15.00m to 18.35m

NOTES

JOB

277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-C7

SHEET 1
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	07-Jan-21 to 08-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.43mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294186.0 E 6253723.4 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING & CASING: AD/T (0.00 to 6.55m); WB (below 6.55m)

WATER: 100% Polymer Return (with superfoam) (below 6.55m)

DRILLING PENETRATION: E

GROUNDWATER LEVELS: 2.00m, 1/08/2021

DEPTH (R.L.) m (mAHD)	SAMPLES	FIELD TESTS	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
0.00	E 0.10m			Silty CLAY: medium to high plasticity, dark brown, with fine to medium grained sand, trace rootlets	w < PL		TOP SOIL 0.00: PID = 0 ppm
0.30 (36.13)			CH	Silty CLAY: medium to high plasticity, brown mottled grey, with fine grained sand			RESIDUAL SOIL
0.50	0.50m SPT 450mm E	4;4,6 N=10				St	0.50: PID = 0.3 ppm
1.00	1.00m SPT 450mm E	3;7,9 N=16		1.00-1.50: Becomes brown mottled grey		VSt	1.00: PID = 0.1 ppm
1.50	1.50m SPT 550mm E	5;9,15 N=24		1.50-2.00: Becomes grey mottled brown			1.50: PID = 0.1 ppm
2.00	2.00m SPT 600mm E 2.45m	6;9,11 N=20		2.00-3.00: Becomes red-brown mottled grey			2.00: PID = 0.1 ppm 2.00: Water Level and moisture influenced by overnight rain
3.00 (33.43)	3.00m SPT 450mm 3.45m	2;3,5 N=8	CL	Sandy silty CLAY: low plasticity, pale grey, fine grained sand	w > PL	L	
4.50	4.50m SPT 450mm 4.95m	4;9,8 N=17		4.50-6.00: Becoming mottled pale grey and red-brown, trace fine to medium sub-angular ironstone gravel		MD	
6.00 (30.43)	6.00m SPT 450mm 6.55m	11;15,13 N=28	CI	Silty CLAY: medium plasticity, mottled red-brown, yellow-brown and grey, with fine grained sand, trace fine to coarse sub-angular ironstone gravel	w ~ PL	VSt	
7.50	7.50m SPT 550mm	7;10,13 N=23			w ~ PL		

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-C7

SHEET 2
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	07-Jan-21 to 08-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.43mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294186.0 E 6253723.4 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
WB	100% Polymer Return (with superfoam)	E		8.10m			CI		Silty CLAY: medium plasticity, mottled red-brown, yellow-brown and grey, with fine grained sand, trace fine to coarse sub-angular ironstone gravel *(continued)*	w ~ PL	VSt	RESIDUAL SOIL
				9.00m SPT 600mm	3;5,5 N=10	9			9.00-9.50: becoming grey mottled dark grey			
				9.50m U75 400mm		9.50 *(26.93)*	CI		Silty CLAY: medium plasticity, grey mottled dark grey, with fine grained sand		F	
				9.90m								
						10						
		F										
				11.00m SPT 150mm 11.15m	15/150s N=30**	11 11.10					H	
						11.15			EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, grey			BEDROCK
									Continued as cored borehole			
						12						
						13						
						14						
						15						
						16						

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
277863

CORED BOREHOLE RECORD

ABH-C7

SHEET 3 OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	07-Jan-21 to 08-Jan-21
CONTRACTOR	BG Drilling	ANGLE	Vertical
DRILL MODEL	D&B-D8	BEARING	-
DRILLER	JC	HOLE DIAMETER	100mm
LOCATION	769 Mamre Road,	MOUNT	Track

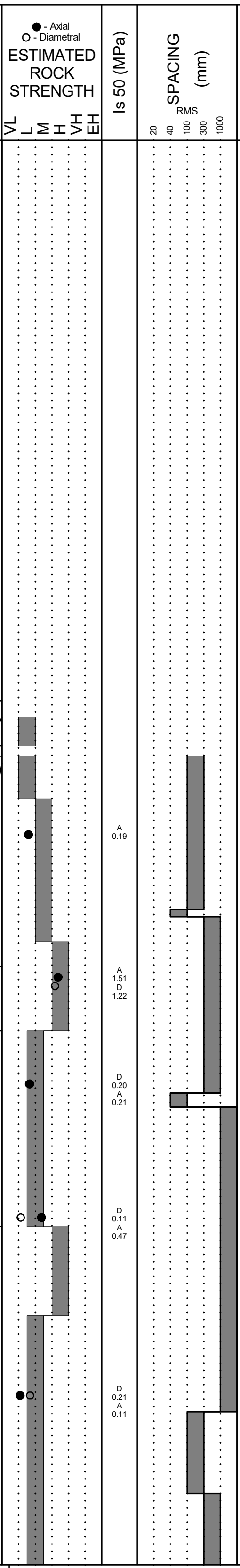
GROUND LEVEL RL 36.43mAHD
LOCATION 294186.0 E 6253723.4 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

DRILLING

DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)
HQ3	7	93	79/(64)	100% Water Return
	0	100	98/(68)	
	0	100	98/(98)	

STRATA / MATERIAL DESCRIPTION

SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING
	11.15		Continued from borehole	
	11.24 (25.19)	× ×	EXTREMELY WEATHERED SILTSTONE, recovered as silty clay, grey	XW
	11.40	× ×	SILTSTONE, grey, thinly laminated	HW
	11.46	×	Core Loss: 11.4-11.46m	XW
ABH-C7_11.80 Core		× ×	SILTSTONE (90%) INTERBEDDED WITH SANDSTONE (10%), grey, thinly laminated, sandstone is fine grained, pale grey	HW
	12.12 (24.31)	· · ·	SANDSTONE (80%) INTERBEDDED WITH SILTSTONE (20%), fine grained, pale grey, thinly laminated, siltstone is dark grey 12.52-12.80: Sandstone bed, fine grained, pale grey, thinly laminated	FR
ABH-C7_13.42 Core ABH-C7_15.13 Core	13.30 (23.13)	× ×	SILTSTONE (95%) INTERBEDDED WITH SANDSTONE (5%), pale grey, thinly laminated to very thinly bedded, sandstone is fine grained, pale grey 14.35-14.57: Sandstone bed, fine grained, pale grey 15.21-15.28: Sandstone bed, fine grained, pale grey	HW SW



DISCONTINUITIES

GENERAL DESCRIPTION
Angle, Shape, Roughness, Infill, Thickness

- 11.46: BP 0-5° Clay CO UN RF
- 11.64: BP 5° Clay VNR PR RF
- 11.81: BP 15° CN PR RF
- 11.92 - 11.95: WE 0° PR S 30mm
- 12.16: JT 60° CN CU RF healed
- 12.32: BP 10° CN PR RF
- 12.36: BP 0° CN PR RF
- 13.35: BP 0° CN PR RF
- 13.36: SM 30° Clay CO PR S 5mm
- 13.43: SM 0° Clay CO PR S 5mm
- 15.14: BP 0-5° QZ/CA CO UN RF 1mm
- 15.15: BP 5° QZ/CA CO UN RF 1mm
- 15.43: BP 0-10° CN UN RF
- 15.70: BP 0-5° CN UN RF

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

CORED BOREHOLE RECORD

ARUP

ABH-C7 SHEET 4 OF 4

CLIENT Confidential
PROJECT Kemps Creek

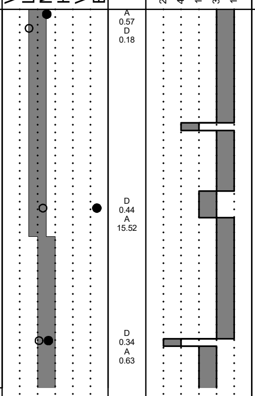
LOGGED BY LJ
CHECKED BY PC
DRILLED DATE 07-Jan-21 to 08-Jan-21

CONTRACTOR BG Drilling
DRILL MODEL D&B-D8
DRILLER JC
LOCATION 769 Mamre Road,

ANGLE Vertical
BEARING -
HOLE DIAMETER 100mm
MOUNT Track

GROUND LEVEL RL 36.43mAHD
LOCATION 294186.0 E 6253723.4 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

DRILLING					STRATA			MATERIAL DESCRIPTION						DISCONTINUITIES
DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	● - Axial O - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
HQ3	0	100	98/(98)	100% Water Return	ABH-C7_17.75 Core	17 18 18.00 (18.43)	× ×	SILTSTONE (95%) INTERBEDDED WITH SANDSTONE (5%), pale grey, thinly laminated to very thinly bedded, sandstone is fine grained, pale grey *(continued)* 16.90-17.00: Sandstone (60%) siltstone (40%), distinct lamination 17.00-17.20: Mudstone bed	SW		A 0.57 D 0.18 D 0.44 A 15.52 D 0.34 A 0.63			16.60: BP 0-20° CN UN RF 16.64: BP 0-10° CN UN RF 16.96: BP 0-5° QZ/CA CO UN RF 1mm 17.09: JT 90° CN PR S 17.10: BP 0° CN PR RF 17.74: BP 0-10° CN UN RF 17.76: JT 90° CN PR S 17.78: BP 0° CN PR RF
						19 20 21 22 23 24		End of borehole at 18.00m Termination: Target depth						



NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

BOREHOLE PHOTO RECORD

ABH-C7

SHEET 1
OF 1

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	
		DRILLED DATE	07-Jan-21 to 08-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.43mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294186.0 E 6253723.4 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,			COORDINATE SYSTEM	GDA 1994 MGA Zone 56

ABH-C7: 11.15m to 18.00m

NOTES

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NON-CORED BOREHOLE RECORD

ABH-C8

SHEET 1

OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 01-Jun-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.96mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294397.4 E 6253704.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING

DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS
0.00–6.00: AD/T; HW casing		E	▽ 1/05/2021 (approx. 4.2m)
6.00–8.00: WB	100% Water Return		

STRATA

SAMPLES	FIELD TESTS
1.00m D 100mm 1.10m	
1.50m SPT 450mm 2.00m	3;6,9 N=15
2.00m U75 400mm 2.40m	
2.50m D 100mm 2.60m	
3.00m SPT 500mm 3.50m	3;21/300 N=21*
4.00m D 100mm 4.10m	
4.50m SPT 500mm 5.00m	4;17/300 N=17*
6.00m SPT 500mm 6.50m	5;16/300 N=16*
7.50m SPT 500mm 8.00m	16;45/300 N=45*

DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	MATERIAL DESCRIPTION SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	OBSERVATION Comments / Penetration Rate
0.00–0.40 (36.56)		Silty CLAY: medium plasticity, brown, with fine grained sand, trace rootlets, trace rootlets	TOP SOIL
0.40–1.50 (35.46)	CI-CH	Silty CLAY: medium to high plasticity, pale yellow-brown, with fine grained sand	RESIDUAL SOIL
1.50–4.50 (32.46)	CH	Silty CLAY: high plasticity, pale grey mottled yellow-brown, with fine grained sand 3.00-4.50: Becomes grey mottled pale yellow-brown and red	
4.50–8.00	CI	Silty CLAY: medium plasticity, pale grey mottled yellow-brown and red-brown, with fine grained sand, with fine sub-angular ironstone gravel 5.30: Gravel lens 6.00-6.10: Gravel lens, 10mm, red-brown fine to medium rounded clayey sandstone gravel 7.50-8.00: Gravel lenses	

CONDITION

WATER / MOISTURE	
0.00–4.25	w ~ PL
4.25–6.00	w > PL
6.00–8.00	w ~ PL

CONSISTENCY	
0.40–1.50	F
1.50–7.00	VSt
7.00–8.00	H

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-C8

SHEET 2
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 01-Jun-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.96mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294397.4 E 6253704.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
WB	100% Water Return	F		9.00m SPT 100mm 9.10m	35/110s N>50**	9 9.10	CI		Silty CLAY: medium plasticity, pale grey mottled yellow-brown and red-brown, with fine grained sand, with fine sub-angular ironstone gravel *(continued)* 8.00-9.00: Gravel component reduces to trace	w ~ PL	H	RESIDUAL SOIL SH IV/V EXTREMELY WEATHERED BEDROCK
						10 11 12 13 14 15 16			Continued as cored borehole			

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB
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ARUP

CORED BOREHOLE RECORD

ABH-C8

SHEET 3 OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 01-Jun-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.96mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294397.4 E 6253704.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING

DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)
HQ3	3	97	94/(49)	100% Polymer Return
	0	100	100/(79)	
	0	100	98/(96)	

STRATA

SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)
	9.10 (27.86)
	9.64 (27.32)
	10.35 (26.61)
	11.16
	11.24 (25.72)
	11.86 (25.10)
ABH-C8_14.40 Core	

MATERIAL DESCRIPTION

ROCK TYPE
Grain Size, Texture/Fabric, Colour, Minor Components

DEPTH	ROCK TYPE	WEATHERING	Is 50 (MPa)
9.10	Continued from borehole SILTSTONE, brown, thinly laminated, undulating beds dipping from 0 to 15°, iron staining	HW	D A 0.06
9.64	SILTSTONE, brown, thinly laminated, iron staining	HW	
10.35	SILTSTONE (80%) INTERBEDDED WITH SANDSTONE (20%), grey, thickly laminated to thinly bedded, sandstone is fine grained, pale grey	SW	D 0.32 A 0.03 D 0.46 A 0.09
11.16	Core Loss: 11.16-11.24m	XW	
11.24	SILTSTONE (80%) INTERBEDDED WITH SANDSTONE (20%), grey, thickly laminated to very thinly bedded, sandstone is fine grained, pale grey	HW SW	D 0.45 A 0.89
11.86	SANDSTONE (60%) INTERBEDDED WITH SILTSTONE (40%), fine grained, grey, layered, thickly laminated to thinly bedded, siltstone is dark grey 11.36-11.44: Sandstone bed, fine grained, pale grey 13.30-13.95: Sandstone bed, fine grained, pale grey	SW FR	D 1.37 A 0.05 D 0.50 A 0.49 D 0.38 A 0.42 D 0.61 A 0.65 A 0.40 D 0.40 A 0.66

ESTIMATED ROCK STRENGTH: ● - Axial ○ - Diametral; VL L M H VH EH

SPACING (mm) RMS: 20 40 100 300 1000

DISCONTINUITIES

GENERAL DESCRIPTION
Angle, Shape, Roughness, Infill, Thickness

- 9.14: SM 0° Clay, gravel PR RF
- 9.22: SM 0° Clay, gravel PR RF
- 9.43: JT 0-15° CN UN RF
- 9.51: SM 0° Clay PR RF 2mm
- 9.52: SM 0° Clay PR RF 2mm
- 9.60: JT 70° Clay VNR PR RF
- 9.62: SM 0° Clay PR RF 8mm
- 9.82: JT 50° Clay VNR PR S
- 9.85: JT 85° Clay VNR PR S
- 10.28: SM 0° PR RF 5mm
- 10.30: SM 5° Clay PR RF 3mm
- 10.33: SM 0° Clay PR RF 2mm
- 10.52: BP 0° CN PR RF
- 10.22 - 11.25: SM 0° Clay PR RF 30mm
- 11.09 - 11.16: FZ 70mm
- 11.24: WE 0° PR RF 5mm
- 11.87: WE 0° PR S 2mm
- 12.09: BP 0° CN PR RF
- 12.85: BP 0-20° CN UN RF
- 13.18: BP 5° CN PR RF
- 13.30: BP 0° CN PR RF
- 13.43: BP 10° CN PR RF
- 13.95: JT 25° CN PR S
- 14.41: BP 0-5° CN UN RF
- 14.75: BP 5° CN PR S
- 15.63: BP 0° CN PR RF
- 15.66: BP 0° CN PR RF
- 15.95: BP 0° CN PR RF 1mm

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

CORED BOREHOLE RECORD

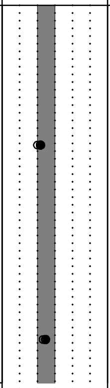
ABH-C8

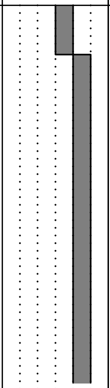
SHEET 4
OF 4

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	05-Jan-21 to 01-Jun-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 36.96mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294397.4 E 6253704.2 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING					STRATA			MATERIAL DESCRIPTION				DISCONTINUITIES		
DRILLING & CASING	CORE LOSS %	TCR % (Drill rate)	SCR % / (RQD %)	FLUSH RETURN % (TYPE)	SAMPLES & FIELD TESTS	DEPTH (R.L.) m (mAHD)	GRAPHIC LOG	ROCK TYPE Grain Size, Texture/Fabric, Colour, Minor Components	WEATHERING	● - Axial O - Diametral ESTIMATED ROCK STRENGTH VL L M H VH EH	Is 50 (MPa)	SPACING (mm) RMS 20 40 100 300 1000	VISUAL LOG	GENERAL DESCRIPTION Angle, Shape, Roughness, Infill, Thickness
HQ3	0	100	98/(96)	100% Polymer Return				SANDSTONE (60%) INTERBEDDED WITH SILTSTONE (40%), fine grained, grey, layered, thickly laminated to thinly bedded, siltstone is dark grey *(continued)* 16.27-17.09: Sandstone bed, fine grained, pale grey	FR		D 0.31 A 0.38			16.05: BP 0° VNR PR RF 16.25: BP 0° CN PR RF 16.26: BP 0° CN PR RF 1mm
						17		17.09-18.00: Becomes thinly to medium bedded						17.05: BP 0° CN PR RF 17.06: BP 0° CN PR RF
					ABH-C8_17.41 Core						D 0.45 A 0.53			
					1.1	18 18.00 *(18.96)*		End of borehole at 18.00m Termination: Target depth						
						19								
						20								
						21								
						22								
						23								
						24								





NOTES

See explanatory notes for details of abbreviations and basis of descriptions

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ARUP

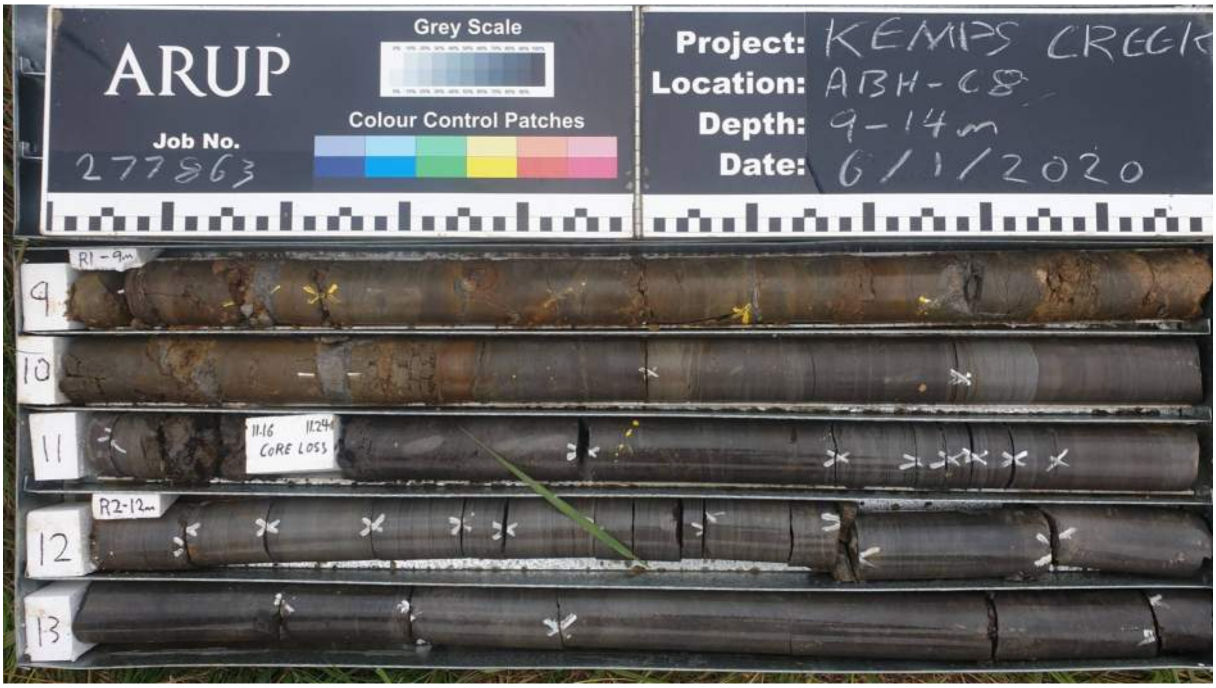
BOREHOLE PHOTO RECORD

ABH-C8

SHEET 1

OF 1

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	
		DRILLED DATE	05-Jan-21 to 01-Jun-21
CONTRACTOR	BG Drilling	GROUND LEVEL	RL 36.96mAHD
DRILL MODEL	D&B-D8	LOCATION	294397.4 E 6253704.2 N
DRILLER	JC	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	COORDINATE SYSTEM	GDA 1994 MGA Zone 56
ANGLE	Vertical		
BEARING	-		
HOLE DIAMETER	100mm		



ABH-C8: 09.00m to 14.00m

ABH-C8: 14.00m to 18.00m

NOTES

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NON-CORED BOREHOLE RECORD

ABH-P1

SHEET 1
OF 1

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 37.69mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294493.2 E 6253857.1 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m		0.20 (37.49)			Silty CLAY: medium to high plasticity, dark brown, with fine grained sand, trace rootlets	w < PL		TOP SOIL
				0.50m SPT E 1.00m SPT E 1.50m SPT E 2.00m SPT E 2.45m	5;8,11 N=19 3;7,8 N=15 5;9,12 N=21 5;8,10 N=18	3.00 (34.69)	CI		Silty CLAY: medium plasticity, orange-red-brown mottled grey, with fine grained sand 0.80-1.10: pale brown mottled black, medium plasticity 2.30: Trace black organic content		VSt - H	RESIDUAL SOIL
				3.00m SPT 3.45m	4;6,9 N=15	3.45 (34.24)	CI		Silty CLAY: grey-green mottled orange-red, trace fine grained sand 3.30: Trace black organic content, with red-brown fine to medium rounded ironstone gravel			

End of borehole completed at 3.45m
Termination: Target depth
Groundwater: Not Encountered

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

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ARUP

NON-CORED BOREHOLE RECORD

ABH-P2

SHEET 1
OF 1

CLIENT Confidential
PROJECT Kemps Creek

LOGGED BY LJ
CHECKED BY PC
DRILLED DATE 12-Jan-21

CONTRACTOR BG Drilling
DRILL MODEL D&B-D8
DRILLER JC
LOCATION 769 Mamre Road,

ANGLE Vertical
BEARING -
HOLE DIAMETER 100mm
MOUNT Track

GROUND LEVEL RL 40.94mAHD
LOCATION 294630.6 E 6253847.2 N
ELEVATION DATUM Australian Height Datum (AHD)
COORDINATE SYSTEM GDA 1994 MGA Zone 56

DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E		0.20 (40.74)		Silty CLAY: medium to high plasticity, dark brown, with fine grained sand, trace rootlets			TOP SOIL
				0.50m SPT E	6;8,9 N=17		CH	Silty CLAY: high plasticity, orange-red mottled grey	w < PL-w ~ PL	VSt	RESIDUAL SOIL
				1.00m SPT E	3;6,8 N=14	1		1.00-1.50: Becomes mottled orange-red and grey			
				1.50m SPT E	5;8,13 N=21			1.50-2.30: Becomes grey mottled orange-red			
				2.00m SPT E	7;18,21 N=39	2 2.30 (38.64)					
				2.45m			CI	EXTREMELY WEATHERED SILTSTONE: recovered as silty clay, medium plasticity, yellow-grey, thinly laminated			
				3.00m SPT	8;12,12 N=24	3					
				3.45m		3.45 (37.49)		End of borehole completed at 3.45m Termination: Target depth Groundwater: Not Encountered			
						4					
						5					
						6					
						7					
						8					

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB 277863

ARUP

NON-CORED BOREHOLE RECORD

ABH-P3

SHEET 1

OF 1

CLIENT	Confidential	LOGGED BY	LJ
PROJECT	Kemps Creek	CHECKED BY	PC
		DRILLED DATE	12-Jan-21

CONTRACTOR	BG Drilling	ANGLE	Vertical	GROUND LEVEL	RL 38.79mAHD
DRILL MODEL	D&B-D8	BEARING	-	LOCATION	294649.6 E 6253685.6 N
DRILLER	JC	HOLE DIAMETER	100mm	ELEVATION DATUM	Australian Height Datum (AHD)
LOCATION	769 Mamre Road,	MOUNT	Track	COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA				MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m				Silty CLAY: low plasticity, brown, with fine to medium sand, trace rootlets	w < PL	St	TOP SOIL
				0.50m SPT E	6;6,6 N=12	0.80 (37.99)					
				1.00m SPT E	3;5,7 N=12		CH	Silty CLAY: high plasticity, red-brown 1.40-1.70: Trace black organic content, with red-brown fine to medium rounded ironstone gravel			RESIDUAL SOIL
				1.50m SPT E	2;4,5 N=9	1.50 (37.29)	CI-CH	Silty CLAY: medium to high plasticity, orange-red mottled grey 1.70-3.45: Becomes mottled red-brown, brown and yellow-brown	w ~ PL		
				2.00m SPT E	3;3,5 N=8						
				2.45m							
				3.00m SPT	3;6,9 N=15					VSt	
				3.45m		3.45 (35.34)		End of borehole completed at 3.45m Termination: Target depth Groundwater: Not Encountered			

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

JOB

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ARUP

NON-CORED BOREHOLE RECORD

ABH-P4

SHEET 1
OF 1

CLIENT	Confidential
PROJECT	Kemps Creek
LOGGED BY	LJ
CHECKED BY	PC
DRILLED DATE	12-Jan-21
CONTRACTOR	BG Drilling
DRILL MODEL	D&B-D8
DRILLER	JC
LOCATION	769 Mamre Road,
ANGLE	Vertical
BEARING	-
HOLE DIAMETER	100mm
MOUNT	Track
GROUND LEVEL	RL 37.68mAHD
LOCATION	294480.4 E 6253696.1 N
ELEVATION DATUM	Australian Height Datum (AHD)
COORDINATE SYSTEM	GDA 1994 MGA Zone 56

DRILLING				STRATA					MATERIAL DESCRIPTION	CONDITION		OBSERVATION
DRILLING & CASING	WATER	DRILLING PENETRATION	GROUNDWATER LEVELS	SAMPLES	FIELD TESTS	DEPTH (R.L.) m (mAHD)	GROUP SYMBOL	GRAPHIC LOG	SOIL TYPE Plasticity / Grain Size, Colour, Minor Components	WATER / MOISTURE	CONSISTENCY	Comments / Penetration Rate
AD/T		E		E 0.10m		0.10 (37.58)			FILL - sandy silt: grey, fine to coarse sand, trace gravel			FILL
				0.50m SPT E	2;5,7 N=12	0.60 (37.08)	ML		Silty CLAY: high plasticity, brown, with fine to medium grained sand, trace rootlets	w < PL	St	RESIDUAL SOIL
				1.00m SPT E 1.50m D E 2.90m D 3.00m	2;4,5 N=9	3.00 (34.68)	CH		Silty CLAY: high plasticity, red-brown mottled grey, with fine grained sand	w ~ PL		1.50: SPT chain break. Test abandoned.

End of borehole completed at 3m
Termination: Target depth
Groundwater: Not Encountered

NOTES

See explanatory notes for details of abbreviations and basis of descriptions

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Appendix C

Data Validation

C1 Data quality indicators and data validation

This section summarises the data quality assessment, which involves checking the validity and usability of data collected throughout the investigation to ensure that the data is representative and reliable for interpretation. The principal assessment measures (i.e. Data Quality Indicators (DQIs)) are precision, accuracy or bias, representativeness, completeness and comparability. This data quality assessment has been undertaken in general accordance with Schedule B2 of the ASC NEPM.

C1.1 Data quality indicators

DQIs define the maximum allowable error in the data collected to assess the reliability of field procedures and analytical results. Five indicators are used in accordance with ASC NEPM: precision, accuracy, representativeness, completeness and comparability.

- Precision – A quantitative measure of the variability (or reproducibility) of the data.
- Accuracy - A quantitative measure of the closeness of reported data to the true value.
- Representativeness – the confidence (expressed qualitatively) that the data are representative of each media present on the Subject Site.
- Completeness – a measure of the amount of useable data (expressed as a %) from a data collection activity.
- Comparability – the confidence (expressed qualitatively) that the data may be considered to be equivalent for each sampling and analytical event.

The DQIs relevant to this project are presented in the tables below along with an assessment of whether they have been met based on the available quality assurance and quality control (QA/QC) documentation, which encompass both sampling technique (field QA/QC, shown in Table D.2) and laboratory analysis (laboratory QA/QC, shown in Table D.3).

C1.2 Field QA/QC

This section summarises the assessment of field quality assurance / quality control (QA/QC) data quality indicators.

Table 14: Field QA/QC data quality indicators

Data quality indicators	Complete	Comment
Sampling techniques compliant with standards	Yes	Samples were collected in general accordance with AS 4482.1.
Field documentation was complete	Yes	Sampling documentation was recorded in general accordance with AS 4482.1.

Samples were kept chilled at 4.0°C ± 2°C	Qualified	Samples were received at the laboratory within the recommended temperature range with the following outliers: • ES2100356 9.5°C ice was present with samples • ES2101105 0.7°C, ice was present with samples. The potential for bias in samples results is considered to be insignificant as the COPCs tested in this investigation were non-volatile and therefore less susceptible to volatilisation at temperatures above 6°C.
Samples collected in correct containers with preservative (if required)	Yes	Samples were collected in laboratory supplied containers, including HDPE containers for PFAS analysis.
Chain of custody documentation completed	Yes	COC documentation was completed for all sample batches.
Adequate frequency of field QA/QC samples collected	Yes	A total of 16 primary samples and one duplicate sample were analysed.
Field duplicate RPDs within acceptance limits Refer to Table C1.	Qualified	All calculated RPDs were within acceptance limits, with the following exceptions: ES2101105 • Barium – RPD of 71 (above 50).
Field Triplicate RPDs within acceptance limits	N/A	No field triplicate samples.
Trip blank results are less than LOR	N/A	No trip blank samples.
Rinsate sample results are less than LOR Refer to Table C2.	Qualified	Heavy metals (barium, chromium, manganese and zinc) were detected at trace concentrations marginally above the LOR in rinsate sample ABH-C7. The results do not indicate potential for significant cross-contamination between samples or bias in sample results.

C1.3 Laboratory QA/QC

This section summarises the assessment of laboratory quality assurance / quality control (QA/QC) data quality indicators.

Table 15: Laboratory QA/QC data quality indicators

Data quality indicators	Complete	Comment
Laboratories are NATA accredited	Yes	ALS is accredited by NATA.
Samples extracted and analysed within holding times	Qualified	Holding time breaches relating to Arup samples: ES2100356 • ABCH2-0.5 m analysed for moisture content on 22/01/21, but was due 20/01/21. • ABCH2-0.5 m extracted on 21/01/21 but was due 20/01/21. ES2101105 • ABH-C4 1.0m extracted 18/01/21 but was due 14/01/21. • ABH-A5 1.5m extracted 18/01/21 but was due 15/01/21. • Instructions for samples ABH-A4 1.0m, ABH-A5 1.5m and ABH-C4 1.0m were received on 19/01/21 after the samples were received on 13/01/21.
Analytical methods are used in accordance with Schedule B3 of the ASC NEPM	Yes	Refer to ALS QA/QC Compliance Assessment Report.
Laboratory limits of reporting (LOR) are low enough to allow comparison with assessment criteria	Yes	LORs were below the relevant assessment criteria.
Adequate frequency of laboratory QA/QC samples tested	Qualified	Outliers relating to Arup samples: ES2100356 • Soluble Major Cations – actual rate of 0% compared to expected 10% rate.
Laboratory method blank sample results are within acceptance limits	Yes	No outliers reported.
Laboratory duplicate sample results are within acceptance limits	Yes	No outliers reported.
Laboratory control sample results are within acceptance limits	Yes	No outliers reported.
Laboratory matrix spike sample results are within acceptance limits	Qualified	Outliers relating to Arup samples: ES2101105

		• Chloride – Matrix spike recovery not determined, background level greater than or equal to 3x spike level. • Mecoprop - Recovery less than lower data quality objective. • MCPA - Recovery less than lower data quality objective. • 2,4-D - Recovery less than lower data quality objective. • Picloram - Recovery less than lower data quality objective.
Laboratory surrogate recovery results are within acceptance limits	Yes	No outliers reported.

C1.4 Data quality assessment summary

The data quality assessment found that the majority of data quality indicators were compliant or within acceptable limits. Minor outliers were identified which are not considered to affect the overall representativeness and usability of the data and therefore the analytical results are suitable for interpretive use.

Table C1
RPD Table
Kemps Creek Data Centre

Field ID	Lab Report Number	Date	Matrix Type	Sample Type	Total Recoverable Metals															Soluble Major Cations			
					Arsenic	**Barium**	**Beryllium**	**Boron**	**Cadmium**	**Chromium (III+VI)**	**Cobalt**	**Copper**	**Lead**	**Manganese**	**Mercury**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**	**Calcium (filtered)**	**Magnesium (filtered)**	**Sodium (filtered)**	**Potassium (filtered)**
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					5	10	1	50	1	2	2	5	5	5	0.1	2	5	5	5	10	10	10	10
ABH-C3 0.5m	**ES2101105**	**11/01/2021**	**soil**	**Normal**	**6**	**230**	<1	<50	<1	**14**	**4**	**19**	**10**	**45**	<0.1	**6**	<5	**40**	**22**	<10	<10	**760**	<10
ABH-C3 0.5m-D1	**ES2101105**	**11/01/2021**	**soil**	**Field_D**	**6**	**110**	<1	<50	<1	**14**	**4**	**22**	**11**	**53**	<0.1	**7**	<5	**37**	**23**	<10	<10	**760**	<10
RPD					0	71	0	0	0	0	0	15	10	16	0	15	0	8	4	0	0	0	0

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any

Notes
Bold indicates a detection above the laboratory limit of reporting
"mg'kg" - milligrams per kilogram

Table C2
QC Water samples data
Kemps Creek Data Centre

					Total Recoverable Metals														
					Arsenic	**Barium**	**Beryllium**	**Boron**	**Cadmium**	**Chromium (III+VI)**	**Cobalt**	**Copper**	**Lead**	**Manganese**	**Mercury**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
					mg/L	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
EQL					0.001	0.001	0.001	0.05	0.0001	0.001	0.001	0.001	0.001	0.001	0.0001	0.001	0.01	0.01	0.005
Field ID	**Date**	**Lab Report Number**	**Sample Type**	**Matrix Type**															
Rinsate (ABH-C7)	**7/01/2021**	**ES2101105**	**Rinsate**	**water**	<0.001	**0.003**	<0.001	<0.05	<0.0001	**0.001**	<0.001	<0.001	<0.001	**0.007**	<0.0001	<0.001	<0.01	<0.01	**0.008**

Notes

Bold indicates a detection above the laboratory limit of reporting.

"mg/L" - milligrams per litre

Appendix D

Soil Analytical Results

Table D1
Soil Analytical Data
Kemps Creek Data Centre

					Moisture	Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carboxylic Acids												
					Moisture Content	Perfluorobutane sulfonic acid (PFBS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorodecane sulfonic acid (PFDS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorobutanoic acid (PFBA)	Perfluorohexanoic acid (PFHxA)	Perfluoropentanoic acid (PFPeA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorononanoic acid (PFNA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)
					%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.1	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002	0.0002	0.0005
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind (Maintenance of ecosystems)																								
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 3 Ecological direct exposure (Maintenance of ecosystems)											1					10								
PFAS NEMP 2020 Table 2 HIL D Industrial/ commercial (Human health)																50								
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (Human health)																								
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (Human health)																								
0-1m																								
1-2m																								
2-4m																								
>=4m																								
CRC CARE 2011 HSL-D for Direct Contact Commercial / Industrial (Human health)																								
CRC CARE 2011 HSL for Direct Contact Intrusive Maintenance Worker (Human health)																								
AS 2159 2009 Table 6.4.2(C) Exposure classification for concrete piles in soil (Buildings and structures)																								
PFAS NEMP 2020 Double Composite Landfill Acceptance Criteria							50				50					50								
PFAS NEMP 2020 Clay/Single Composite Lined Landfill Acceptance Criteria							50				50					50								
PFAS NEMP 2020 Unlined Landfill Acceptance Criteria							20				20					50								
NSW 2014 General Solid Waste CT1 (No Leaching)																18								
NSW 2014 Restricted Solid Waste SCC2 (with leached)																72								
Field ID	**Date**	**Lab Report Number**	**Matrix Type**	**Sample Type**																				
ABH-A1 0.1m	12/01/2021	ES2101105	soil	Normal	**12.9**	<0.0002	**0.0003**	<0.0002	<0.0002	<0.0002	**0.0070**	<0.001	<0.0002	<0.0002	<0.0002	**0.0012**	**0.0003**	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-A2 1.0m	12/01/2021	ES2101105	soil	Normal	**16.3**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-A3 0.5m	11/01/2021	ES2101105	soil	Normal	**15.6**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-A4 1.0m	11/01/2021	ES2101105	soil	Normal	**14.5**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-A5 1.5m	8/01/2021	ES2101105	soil	Normal	**16.1**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-A6 0.5m	12/01/2021	ES2101105	soil	Normal	**14.4**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABHC2 0.5m	6/01/2021	ES2100356	soil	Normal	**18.8**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	**0.0004**	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-C1 0.5m	6/01/2021	ES2100356	soil	Normal	**8.2**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-C3 0.5m	11/01/2021	ES2101105	soil	Normal	**15.8**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-C3 0.5m-D1	11/01/2021	ES2101105	soil	Field_D	**15.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C4 1.0m	7/01/2021	ES2101105	soil	Normal	**14.9**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-C6 1.0m	8/01/2021	ES2101105	soil	Normal	**12.6**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-C7 0.5m	7/01/2021	ES2101105	soil	Normal	**14.1**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-P1 1.0m	12/01/2021	ES2101105	soil	Normal	**14.2**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-P2 0.5m	12/01/2021	ES2101105	soil	Normal	**13.7**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-P3 0.5m	12/01/2021	ES2101105	soil	Normal	**8.9**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	**0.0003**	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005
ABH-P4 0m	12/01/2021	ES2101105	soil	Normal	**8.4**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	**0.0006**	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005

Environmental Standards
CRC CARE, 2011, Table B4 HSLs for Direct Contact Commercial / Industrial
CRC CARE, 2011, Table B4 HSLs for Direct Contact Intrusive Maintenance Worker
DoAWE, January 2020, PFAS NEMP 2020 Table 3 Ecological direct exposure
DoAWE, January 2020, PFAS NEMP 2020 Table 2 HIL D Industrial/Commercial
DoAWE, January 2020, PFAS NEMP 2020 Table 7 Landfill Acceptance Criteria
NEPC, 2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil
NEPC, 2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand
NEPC, 2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil
NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
Standards Australia (2009) AS 2159-2009 Table 6.4.2(C) Exposure classification for concrete piles in soil

Notes
Bold indicates a detection above the laboratory limit of reporting
Highlighting indicates an exceedance of the corresponding criteria
"mg/kg" - milligrams per kilogram

Table D1

Soil Analytical Data

Kemps Creek Data Centre

					Perfluoroalkyl Sulfonamides					(n:2) Fluorotelomer Sulfonic Acids				PFAS Sums		Total Recoverable Metals								
					N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFHxS and PFOS	Sum of PFAS	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium (III+VI)	Cobalt	Copper	Lead
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.0002	0.0005	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	5	10	1	50	1	2	2	5	5
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind (Maintenance of ecosystems)																160								
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 3 Ecological direct exposure (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 2 HIL D Industrial/ commercial (Human health)														20										
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (Human health)																3,000		500	300,000	900		4,000	240,000	1,500
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (Human health)																								
0-1m																								
1-2m																								
2-4m																								
>=4m																								
CRC CARE 2011 HSL-D for Direct Contact Commercial / Industrial (Human health)																								
CRC CARE 2011 HSL for Direct Contact Intrusive Maintenance Worker (Human health)																								
AS 2159 2009 Table 6.4.2(C) Exposure classification for concrete piles in soil (Buildings and structures)																								
PFAS NEMP 2020 Double Composite Landfill Acceptance Criteria														50										
PFAS NEMP 2020 Clay/Single Composite Lined Landfill Acceptance Criteria														50										
PFAS NEMP 2020 Unlined Landfill Acceptance Criteria														20										
NSW 2014 General Solid Waste CT1 (No Leaching)														1.8		100		20		20				100
NSW 2014 Restricted Solid Waste SCC2 (with leached)														7.2		2,000		400		400				6,000
Field ID	**Date**	**Lab Report Number**	**Matrix Type**	**Sample Type**																				
ABH-A1 0.1m	12/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.0073**	**0.0088**	**8**	**160**	<1	<50	<1	**18**	**16**	**23**	**22**
ABH-A2 1.0m	12/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**6**	**110**	<1	<50	<1	**16**	<2	**13**	**9**
ABH-A3 0.5m	11/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<5	**10**	<1	<50	<1	**16**	<2	**11**	**14**
ABH-A4 1.0m	11/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**9**	**10**	<1	<50	<1	**25**	**6**	**14**	**12**
ABH-A5 1.5m	8/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**11**	**160**	**1**	<50	<1	**14**	**7**	**37**	**16**
ABH-A6 0.5m	12/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**8**	**300**	<1	<50	<1	**20**	**3**	**18**	**12**
ABHC2 0.5m	6/01/2021	ES2100356	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.0004**	**0.0004**	**8**	**420**	<1	<50	<1	**20**	**4**	**14**	**14**
ABH-C1 0.5m	6/01/2021	ES2100356	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<5	**150**	<1	<50	<1	**30**	**11**	**6**	**10**
ABH-C3 0.5m	11/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**6**	**230**	<1	<50	<1	**14**	**4**	**19**	**10**
ABH-C3 0.5m-D1	11/01/2021	ES2101105	soil	Field_D	-	-	-	-	-	-	-	-	-	-	-	**6**	**110**	<1	<50	<1	**14**	**4**	**22**	**11**
ABH-C4 1.0m	7/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**8**	**90**	<1	<50	<1	**12**	**6**	**16**	**15**
ABH-C6 1.0m	8/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**6**	**100**	<1	<50	<1	**12**	**3**	**13**	**10**
ABH-C7 0.5m	7/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<5	**40**	<1	<50	<1	**13**	<2	**11**	**8**
ABH-P1 1.0m	12/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**5**	**40**	<1	<50	<1	**13**	<2	**17**	**7**
ABH-P2 0.5m	12/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	**10**	**510**	<1	<50	<1	**14**	**2**	**21**	**14**
ABH-P3 0.5m	12/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.0003**	**0.0003**	**9**	**130**	<1	<50	<1	**21**	**16**	**18**	**28**
ABH-P4 0m	12/01/2021	ES2101105	soil	Normal	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.0006**	**0.0006**	**8**	**120**	<1	<50	<1	**26**	**8**	**38**	**29**

Environmental Standards

CRC CARE, 2011, Table B4 HSLs for Direct Contact Commercial / Industrial

CRC CARE, 2011, Table B4 HSLs for Direct Contact Intrusive Maintenance Worker

DoAWE, January 2020, PFAS NEMP 2020 Table 3 Ecological direct exposure

DoAWE, January 2020, PFAS NEMP 2020 Table 2 HIL D Industrial/Commercial

DoAWE, January 2020, PFAS NEMP 2020 Table 7 Landfill Acceptance Criteria

NEPC, 2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil

NEPC, 2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand

NEPC, 2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)

NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)

Standards Australia (2009) AS 2159-2009 Table 6.4.2(C) Exposure classification for concrete piles in soil

Notes

Bold indicates a detection above the laboratory limit of reporting

Highlighting indicates an exceedance of the corresponding criteria

"mg/kg" - milligrams per kilogram

Table D1
Soil Analytical Data
Kemps Creek Data Centre

											Soluble Major Cations				**Chloride by Discrete Analyser**	**Soluble Sulphate**	**pH Lab**							**P**
					Manganese	**Mercury**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**	**Calcium**	**Magnesium**	**Sodium**	**Potassium**	**Chloride**	**Sulphate**	**pH (1:5)**	**Acenaphthene**	**Acenaphthylene**	**Anthracene**	**Benz(a)anthracene**	**Benzo(a) pyrene**	**Benzo(b+j)fluoranthene**	**Benzo(g,h,i)perylene**
					mg/kg	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**-**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
EQL					5	0.1	2	5	5	5	10	10	10	10	10	10	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind (Maintenance of ecosystems)																								
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (Maintenance of ecosystems)																						1.4		
PFAS NEMP 2020 Table 3 Ecological direct exposure (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 2 HIL D Industrial/ commercial (Human health)																								
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (Human health)					60,000	730	6,000	10,000		400,000														
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (Human health)																								
0-1m																								
1-2m																								
2-4m																								
>=4m																								
CRC CARE 2011 HSL-D for Direct Contact Commercial / Industrial (Human health)																								
CRC CARE 2011 HSL for Direct Contact Intrusive Maintenance Worker (Human health)																								
AS 2159 2009 Table 6.4.2(C) Exposure classification for concrete piles in soil (Buildings and structures)																5,000	<5.5							
PFAS NEMP 2020 Double Composite Landfill Acceptance Criteria																								
PFAS NEMP 2020 Clay/Single Composite Lined Landfill Acceptance Criteria																								
PFAS NEMP 2020 Unlined Landfill Acceptance Criteria																								
NSW 2014 General Solid Waste CT1 (No Leaching)						4	40	20														0.8		
NSW 2014 Restricted Solid Waste SCC2 (with leached)						200	4,200	200														23		
Field ID	**Date**	**Lab Report Number**	**Matrix Type**	**Sample Type**																				
ABH-A1 0.1m	12/01/2021	ES2101105	soil	Normal	**1,030**	<0.1	**15**	<5	**43**	**55**	**60**	**100**	**70**	**210**	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ABH-A2 1.0m	12/01/2021	ES2101105	soil	Normal	**16**	<0.1	**3**	<5	**48**	**11**	<10	**30**	**1,270**	<10	-	-	-	-	-	-	-	-	-	-
ABH-A3 0.5m	11/01/2021	ES2101105	soil	Normal	**24**	<0.1	**3**	<5	**46**	**7**	<10	<10	**320**	<10	-	-	-	-	-	-	-	-	-	-
ABH-A4 1.0m	11/01/2021	ES2101105	soil	Normal	**24**	<0.1	**8**	**6**	**62**	**14**	**100**	**520**	**410**	**660**	**110**	**240**	**7.3**	-	-	-	-	-	-	-
ABH-A5 1.5m	8/01/2021	ES2101105	soil	Normal	**26**	<0.1	**7**	<5	**43**	**28**	**20**	**110**	**1,130**	**110**	**1,570**	**380**	**7.6**	-	-	-	-	-	-	-
ABH-A6 0.5m	12/01/2021	ES2101105	soil	Normal	**82**	<0.1	**7**	<5	**48**	**20**	<10	**200**	**390**	**240**	-	-	-	-	-	-	-	-	-	-
ABHC2 0.5m	6/01/2021	ES2100356	soil	Normal	**154**	<0.1	**5**	**5**	**54**	**18**	<10	**10**	**780**	<10	-	-	-	-	-	-	-	-	-	-
ABH-C1 0.5m	6/01/2021	ES2100356	soil	Normal	**507**	<0.1	**4**	<5	**30**	**11**	**10**	**10**	**160**	**10**	-	-	-	-	-	-	-	-	-	-
ABH-C3 0.5m	11/01/2021	ES2101105	soil	Normal	**45**	<0.1	**6**	<5	**40**	**22**	<10	<10	**760**	<10	-	-	-	-	-	-	-	-	-	-
ABH-C3 0.5m-D1	11/01/2021	ES2101105	soil	Field_D	**53**	<0.1	**7**	<5	**37**	**23**	<10	<10	**760**	<10	-	-	-	-	-	-	-	-	-	-
ABH-C4 1.0m	7/01/2021	ES2101105	soil	Normal	**102**	<0.1	**7**	<5	**35**	**26**	<10	**300**	**190**	**410**	**80**	**60**	**5.9**	-	-	-	-	-	-	-
ABH-C6 1.0m	8/01/2021	ES2101105	soil	Normal	**25**	<0.1	**4**	<5	**43**	**16**	<10	**60**	**400**	**80**	-	-	-	-	-	-	-	-	-	-
ABH-C7 0.5m	7/01/2021	ES2101105	soil	Normal	**9**	<0.1	**3**	<5	**36**	**8**	**40**	**470**	**560**	**320**	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ABH-P1 1.0m	12/01/2021	ES2101105	soil	Normal	**69**	<0.1	**7**	<5	**37**	**20**	<10	<10	**840**	<10	-	-	-	-	-	-	-	-	-	-
ABH-P2 0.5m	12/01/2021	ES2101105	soil	Normal	**30**	<0.1	**4**	<5	**43**	**21**	<10	<10	**280**	<10	-	-	-	-	-	-	-	-	-	-
ABH-P3 0.5m	12/01/2021	ES2101105	soil	Normal	**1,790**	<0.1	**8**	<5	**46**	**29**	**20**	**30**	**30**	**70**	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ABH-P4 0m	12/01/2021	ES2101105	soil	Normal	**473**	<0.1	**9**	<5	**37**	**50**	**110**	<10	**90**	**40**	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Environmental Standards
CRC CARE, 2011, Table B4 HSLs for Direct Contact Commercial / Industrial
CRC CARE, 2011, Table B4 HSLs for Direct Contact Intrusive Maintenance Worker
DoAWE, January 2020, PFAS NEMP 2020 Table 3 Ecological direct exposure
DoAWE, January 2020, PFAS NEMP 2020 Table 2 HIL D Industrial/Commercial
DoAWE, January 2020, PFAS NEMP 2020 Table 7 Landfill Acceptance Criteria
NEPC, 2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil
NEPC, 2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand
NEPC, 2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil
NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
Standards Australia (2009) AS 2159-2009 Table 6.4.2(C) Exposure classification for concrete piles in soil

Notes
Bold indicates a detection above the laboratory limit of reporting
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"mg/kg" - milligrams per kilogram

Table D1
Soil Analytical Data
Kemps Creek Data Centre

					olynuclear Aromatic Hydrocarbons (PAH)										Phenolic Compounds									
					Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	3&4-Methylphenol (m&p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol	4-chloro-3-methylphenol
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind (Maintenance of ecosystems)											370													
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 3 Ecological direct exposure (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 2 HIL D Industrial/ commercial (Human health)																								
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (Human health)														4,000										
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (Human health)																								
0-1m											3													
1-2m											15													
2-4m											35													
>=4m											75													
CRC CARE 2011 HSL-D for Direct Contact Commercial / Industrial (Human health)											11,000													
CRC CARE 2011 HSL for Direct Contact Intrusive Maintenance Worker (Human health)											29,000													
AS 2159 2009 Table 6.4.2(C) Exposure classification for concrete piles in soil (Buildings and structures)																								
PFAS NEMP 2020 Double Composite Landfill Acceptance Criteria																								
PFAS NEMP 2020 Clay/Single Composite Lined Landfill Acceptance Criteria																								
PFAS NEMP 2020 Unlined Landfill Acceptance Criteria																								
NSW 2014 General Solid Waste CT1 (No Leaching)														200		8,000	40					4,000		
NSW 2014 Restricted Solid Waste SCC2 (with leached)														800		57,600	288					28,800		
Field ID	**Date**	**Lab Report Number**	**Matrix Type**	**Sample Type**																				
ABH-A1 0.1m	12/01/2021	ES2101105	soil	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ABH-A2 1.0m	12/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-A3 0.5m	11/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-A4 1.0m	11/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-A5 1.5m	8/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-A6 0.5m	12/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABHC2 0.5m	6/01/2021	ES2100356	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C1 0.5m	6/01/2021	ES2100356	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C3 0.5m	11/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C3 0.5m-D1	11/01/2021	ES2101105	soil	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C4 1.0m	7/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C6 1.0m	8/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C7 0.5m	7/01/2021	ES2101105	soil	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ABH-P1 1.0m	12/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-P2 0.5m	12/01/2021	ES2101105	soil	Normal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-P3 0.5m	12/01/2021	ES2101105	soil	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ABH-P4 0m	12/01/2021	ES2101105	soil	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Environmental Standards
CRC CARE, 2011, Table B4 HSLs for Direct Contact Commercial / Industrial
CRC CARE, 2011, Table B4 HSLs for Direct Contact Intrusive Maintenance Worker
DoAWE, January 2020, PFAS NEMP 2020 Table 3 Ecological direct exposure
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NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
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Standards Australia (2009) AS 2159-2009 Table 6.4.2(C) Exposure classification for concrete piles in soil

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Table D1
Soil Analytical Data
Kemps Creek Data Centre

							Organochlorine Pesticides (OC)																		
					Pentachlorophenol	Phenol	4,4-DDE	a-BHC	Hexachlorobenzene	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin ketone
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					2	0.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind (Maintenance of ecosystems)																		640							
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (Maintenance of ecosystems)																									
PFAS NEMP 2020 Table 3 Ecological direct exposure (Maintenance of ecosystems)																									
PFAS NEMP 2020 Table 2 HIL D Industrial/ commercial (Human health)																									
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (Human health)					660	240,000			80		45		530						3,600		2,000				
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (Human health)																									
0-1m																									
1-2m																									
2-4m																									
>=4m																									
CRC CARE 2011 HSL-D for Direct Contact Commercial / Industrial (Human health)																									
CRC CARE 2011 HSL for Direct Contact Intrusive Maintenance Worker (Human health)																									
AS 2159 2009 Table 6.4.2(C) Exposure classification for concrete piles in soil (Buildings and structures)																									
PFAS NEMP 2020 Double Composite Landfill Acceptance Criteria																									
PFAS NEMP 2020 Clay/Single Composite Lined Landfill Acceptance Criteria																									
PFAS NEMP 2020 Unlined Landfill Acceptance Criteria																									
NSW 2014 General Solid Waste CT1 (No Leaching)																					60				
NSW 2014 Restricted Solid Waste SCC2 (with leached)						2,073															432				
Field ID	**Date**	**Lab Report Number**	**Matrix Type**	**Sample Type**																					
ABH-A1 0.1m	12/01/2021	ES2101105	soil	Normal	<2	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A2 1.0m	12/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A3 0.5m	11/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A4 1.0m	11/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A5 1.5m	8/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A6 0.5m	12/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABHC2 0.5m	6/01/2021	ES2100356	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C1 0.5m	6/01/2021	ES2100356	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C3 0.5m	11/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C3 0.5m-D1	11/01/2021	ES2101105	soil	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C4 1.0m	7/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C6 1.0m	8/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C7 0.5m	7/01/2021	ES2101105	soil	Normal	<2	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P1 1.0m	12/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P2 0.5m	12/01/2021	ES2101105	soil	Normal	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P3 0.5m	12/01/2021	ES2101105	soil	Normal	<2	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P4 0m	12/01/2021	ES2101105	soil	Normal	<2	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Environmental Standards

CRC CARE, 2011, Table B4 HSLs for Direct Contact Commercial / Industrial
CRC CARE, 2011, Table B4 HSLs for Direct Contact Intrusive Maintenance Worker
DoAWE, January 2020, PFAS NEMP 2020 Table 3 Ecological direct exposure
DoAWE, January 2020, PFAS NEMP 2020 Table 2 HIL D Industrial/Commercial
DoAWE, January 2020, PFAS NEMP 2020 Table 7 Landfill Acceptance Criteria
NEPC, 2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil
NEPC, 2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand
NEPC, 2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil
NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
Standards Australia (2009) AS 2159-2009 Table 6.4.2(C) Exposure classification for concrete piles in soil

Notes

Bold indicates a detection above the laboratory limit of reporting
Highlighting indicates an exceedance of the corresponding criteria
"mg/kg" - milligrams per kilogram

Table D1
Soil Analytical Data
Kemps Creek Data Centre

											Organophosphorous Pesticides (OP)													
					Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Parathion	Pirimphos-ethyl	Chlorpyrifos-methyl	Demeton-S-methyl	Fenamiphos	Diazinon	Dichlorvos	Dimethoate	Ethion
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind (Maintenance of ecosystems)																								
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 3 Ecological direct exposure (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 2 HIL D Industrial/ commercial (Human health)																								
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (Human health)					100			50		2,500					2,000									
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (Human health)																								
0-1m																								
1-2m																								
2-4m																								
>=4m																								
CRC CARE 2011 HSL-D for Direct Contact Commercial / Industrial (Human health)																								
CRC CARE 2011 HSL for Direct Contact Intrusive Maintenance Worker (Human health)																								
AS 2159 2009 Table 6.4.2(C) Exposure classification for concrete piles in soil (Buildings and structures)																								
PFAS NEMP 2020 Double Composite Landfill Acceptance Criteria																								
PFAS NEMP 2020 Clay/Single Composite Lined Landfill Acceptance Criteria																								
PFAS NEMP 2020 Unlined Landfill Acceptance Criteria																								
NSW 2014 General Solid Waste CT1 (No Leaching)											4													
NSW 2014 Restricted Solid Waste SCC2 (with leached)											30													
Field ID	**Date**	**Lab Report Number**	**Matrix Type**	**Sample Type**																				
ABH-A1 0.1m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A2 1.0m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A3 0.5m	11/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A4 1.0m	11/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A5 1.5m	8/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-A6 0.5m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABHC2 0.5m	6/01/2021	ES2100356	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C1 0.5m	6/01/2021	ES2100356	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C3 0.5m	11/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C3 0.5m-D1	11/01/2021	ES2101105	soil	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C4 1.0m	7/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C6 1.0m	8/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-C7 0.5m	7/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P1 1.0m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P2 0.5m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P3 0.5m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ABH-P4 0m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Environmental Standards
CRC CARE, 2011, Table B4 HSLs for Direct Contact Commercial / Industrial
CRC CARE, 2011, Table B4 HSLs for Direct Contact Intrusive Maintenance Worker
DoAWE, January 2020, PFAS NEMP 2020 Table 3 Ecological direct exposure
DoAWE, January 2020, PFAS NEMP 2020 Table 2 HIL D Industrial/Commercial
DoAWE, January 2020, PFAS NEMP 2020 Table 7 Landfill Acceptance Criteria
NEPC, 2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil
NEPC, 2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand
NEPC, 2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil
NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
Standards Australia (2009) AS 2159-2009 Table 6.4.2(C) Exposure classification for concrete piles in soil

Notes
Bold indicates a detection above the laboratory limit of reporting
Highlighting indicates an exceedance of the corresponding criteria
"mg/kg" - milligrams per kilogram

Table D1
Soil Analytical Data
Kemps Creek Data Centre

										PCBs	Phenoxyacetic Acid Herbicides													
					Fenthion	Malathion	Methyl parathion	Monocrotophos	Prothiofos	PCBs (Sum of total)	2,4,5-Trichlorophenoxy Acetic Acid	2,4,5-TP (Silvex)	Hedonal	2,4-Dichlorprop	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	4-Chlorophenoxy acetic acid	Clopyralid	Dicamba	Fluroxypyr	2-Methyl-4-chlorophenoxyacetic acid	2-Methyl-4-Chlorophenoxy Butanoic Acid	Mecoprop	Picloram	Triclopyr
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.05	0.05	0.2	0.2	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind (Maintenance of ecosystems)																								
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 3 Ecological direct exposure (Maintenance of ecosystems)																								
PFAS NEMP 2020 Table 2 HIL D Industrial/ commercial (Human health)																								
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil (Human health)										7	5,000		9,000							5,000	5,000	5,000	35,000	
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (Human health)																								
0-1m																								
1-2m																								
2-4m																								
>=4m																								
CRC CARE 2011 HSL-D for Direct Contact Commercial / Industrial (Human health)																								
CRC CARE 2011 HSL for Direct Contact Intrusive Maintenance Worker (Human health)																								
AS 2159 2009 Table 6.4.2(C) Exposure classification for concrete piles in soil (Buildings and structures)																								
PFAS NEMP 2020 Double Composite Landfill Acceptance Criteria																								
PFAS NEMP 2020 Clay/Single Composite Lined Landfill Acceptance Criteria																								
PFAS NEMP 2020 Unlined Landfill Acceptance Criteria																								
NSW 2014 General Solid Waste CT1 (No Leaching)										50			200						40				60	40
NSW 2014 Restricted Solid Waste SCC2 (with leached)										50			1,440						300				440	300
Field ID	**Date**	**Lab Report Number**	**Matrix Type**	**Sample Type**																				
ABH-A1 0.1m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-A2 1.0m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-A3 0.5m	11/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-A4 1.0m	11/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-A5 1.5m	8/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-A6 0.5m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABHC2 0.5m	6/01/2021	ES2100356	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-C1 0.5m	6/01/2021	ES2100356	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-C3 0.5m	11/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-C3 0.5m-D1	11/01/2021	ES2101105	soil	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABH-C4 1.0m	7/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-C6 1.0m	8/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-C7 0.5m	7/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-P1 1.0m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-P2 0.5m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-P3 0.5m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
ABH-P4 0m	12/01/2021	ES2101105	soil	Normal	<0.05	<0.05	<0.2	<0.2	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Environmental Standards
CRC CARE, 2011, Table B4 HSLs for Direct Contact Commercial / Industrial
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NEPC, 2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand
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NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)
NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)
Standards Australia (2009) AS 2159-2009 Table 6.4.2(C) Exposure classification for concrete piles in soil

Notes
Bold indicates a detection above the laboratory limit of reporting
Highlighting indicates an exceedance of the corresponding criteria
"mg/kg" - milligrams per kilogram

Appendix E

Laboratory Certificates and COC Documentation

Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2101105**

Client	: **ARUP PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BRAD SCOTT	Contact	: Benjamin Comensoli
Address	: Level 5, 151 Clarence St, Sydney NSW 2000 Sydney	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: brad.scott@arup.com	E-mail	: benjamin.comensoli@alsglobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 277863 Kemps Creek	Page	: 1 of 5
Order number	: 277863	Quote number	: EM2020ARUP0001 (MEBQ-233-19 PRIMARY WORK)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 13-Jan-2021 17:45	Issue Date	: 20-Jan-2021
Client Requested Due Date	: 25-Jan-2021	Scheduled Reporting Date	: **25-Jan-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 5	Temperature	: 0.7 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 76 / 16

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- 20/01/2021: This is an updated SRN which indicates the new scheduled release date for this work order.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EP202(solids) Phenoxyacetic acids	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)	SOIL - NT-1S Major Cations (Ca, Mg, Na, K)	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-13 OC/OP/PCB
ES2101105-001	11-Jan-2021 00:00	ABH-C3 0m	✓						
ES2101105-002	11-Jan-2021 00:00	ABH-C3 0.5m		✓	✓	✓	✓	✓	✓
ES2101105-003	11-Jan-2021 00:00	ABH-C3 0.5m-D2	✓						
ES2101105-004	11-Jan-2021 00:00	ABH-C3 0.5m-D1		✓			✓	✓	
ES2101105-006	11-Jan-2021 00:00	ABH-C3 1.0m	✓						
ES2101105-007	11-Jan-2021 00:00	ABH-C3 1.5m	✓						
ES2101105-008	11-Jan-2021 00:00	ABH-C3 2.0m	✓						
ES2101105-009	12-Jan-2021 00:00	ABH-P3 0.5m		✓	✓	✓	✓	✓	✓
ES2101105-010	12-Jan-2021 00:00	ABH-P3 1.0m	✓						
ES2101105-011	12-Jan-2021 00:00	ABH-P3 1.5m	✓						
ES2101105-012	12-Jan-2021 00:00	ABH-P3 2.0m	✓						
ES2101105-013	12-Jan-2021 00:00	ABH-P1 0m	✓						
ES2101105-014	12-Jan-2021 00:00	ABH-P1 0.5m	✓						
ES2101105-015	12-Jan-2021 00:00	ABH-P1 1.0m		✓	✓	✓	✓	✓	✓
ES2101105-016	12-Jan-2021 00:00	ABH-P1 1.5m	✓						
ES2101105-017	12-Jan-2021 00:00	ABH-P1 2.0m	✓						
ES2101105-018	12-Jan-2021 00:00	ABH-P2 0m	✓						
ES2101105-019	12-Jan-2021 00:00	ABH-P2 0.5m		✓	✓	✓	✓	✓	✓
ES2101105-020	12-Jan-2021 00:00	ABH-P2 1.0m	✓						
ES2101105-021	12-Jan-2021 00:00	ABH-P2 1.5m	✓						
ES2101105-022	12-Jan-2021 00:00	ABH-P2 2.0m	✓						
ES2101105-023	07-Jan-2021 00:00	ABH-C7 0m	✓						
ES2101105-024	07-Jan-2021 00:00	ABH-C7 0.5m		✓	✓	✓	✓	✓	✓
ES2101105-025	07-Jan-2021 00:00	ABH-C7 1.0m	✓						
ES2101105-026	07-Jan-2021 00:00	ABH-C7 1.5m	✓						
ES2101105-027	07-Jan-2021 00:00	ABH-C7 2.0m	✓						
ES2101105-028	07-Jan-2021 00:00	ABH-C7 2.0m_D1	✓						
ES2101105-029	12-Jan-2021 00:00	ABH-P4 0m		✓	✓	✓	✓	✓	✓
ES2101105-030	12-Jan-2021 00:00	ABH-P4 0.5m	✓						
ES2101105-031	12-Jan-2021 00:00	ABH-P4 1.0m	✓						
ES2101105-032	12-Jan-2021 00:00	ABH-P4 1.5m	✓						
ES2101105-034	08-Jan-2021 00:00	ABH-A5 0m	✓						
ES2101105-035	08-Jan-2021 00:00	ABH-A5 0.5m	✓						
ES2101105-036	08-Jan-2021 00:00	ABH-A5 1m	✓						
ES2101105-037	08-Jan-2021 00:00	ABH-A5 1.5m		✓	✓	✓	✓	✓	✓

			(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EP202(solids) Phenoxyacetic acids	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)	SOIL - NT-1S Major Cations (Ca, Mg, Na, K)	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-13 OC/OP/PCB
ES2101105-038	08-Jan-2021 00:00	ABH-A5 1.5m_2	✓						
ES2101105-046	07-Jan-2021 00:00	ABH-C4 0m	✓						
ES2101105-047	07-Jan-2021 00:00	ABH-C4 0.5m	✓						
ES2101105-048	07-Jan-2021 00:00	ABH-C4 1.0m		✓	✓	✓	✓	✓	✓
ES2101105-049	07-Jan-2021 00:00	ABH-C4 1.5	✓						
ES2101105-050	08-Jan-2021 00:00	ABH-C6 0m	✓						
ES2101105-051	08-Jan-2021 00:00	ABH-C6 0.5m	✓						
ES2101105-052	08-Jan-2021 00:00	ABH-C6 1.0m		✓	✓	✓	✓	✓	✓
ES2101105-053	08-Jan-2021 00:00	ABH-C6 1.5m	✓						
ES2101105-055	11-Jan-2021 00:00	ABH-A3 0m	✓						
ES2101105-056	11-Jan-2021 00:00	ABH-A3 0.5m		✓	✓	✓	✓	✓	✓
ES2101105-057	11-Jan-2021 00:00	ABH-A3 1.0m	✓						
ES2101105-058	11-Jan-2021 00:00	ABH-A3 1.5m	✓						
ES2101105-060	11-Jan-2021 00:00	ABH-A4 0m	✓						
ES2101105-061	11-Jan-2021 00:00	ABH-A4 0.5m	✓						
ES2101105-062	11-Jan-2021 00:00	ABH-A4 1.0m		✓	✓	✓	✓	✓	✓
ES2101105-063	11-Jan-2021 00:00	ABH-A4 1.5m	✓						
ES2101105-064	12-Jan-2021 00:00	ABH-A1 0.1m		✓	✓	✓	✓	✓	✓
ES2101105-065	12-Jan-2021 00:00	ABH-A1 0.5m	✓						
ES2101105-066	12-Jan-2021 00:00	ABH-A1 1.0m	✓						
ES2101105-067	12-Jan-2021 00:00	ABH-A1 1.5m	✓						
ES2101105-068	12-Jan-2021 00:00	ABH-A2 0m	✓						
ES2101105-069	12-Jan-2021 00:00	ABH-A2 0.5m	✓						
ES2101105-070	12-Jan-2021 00:00	ABH-A2 1.0m		✓	✓	✓	✓	✓	✓
ES2101105-071	12-Jan-2021 00:00	ABH-A2 1.5m	✓						
ES2101105-072	12-Jan-2021 00:00	ABH-A6 0m	✓						
ES2101105-073	12-Jan-2021 00:00	ABH-A6 0.5m		✓	✓	✓	✓	✓	✓
ES2101105-074	12-Jan-2021 00:00	ABH-A6 1.0m	✓						
ES2101105-075	12-Jan-2021 00:00	ABH-A6 1.5m	✓						
ES2101105-076	08-Jan-2021 00:00	ABH-A5 2.0	✓						
ES2101105-077	08-Jan-2021 00:00	0.0m	✓						

Matrix: **SOIL**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	SOIL - Corr. Sched 7 (SYDNEY) Soil on Concrete & Steel Piles (AS2159-1995)	SOIL - S-14A PAH/Phenols (16 PAH - SIM)
ES2101105-009	12-Jan-2021 00:00	ABH-P3 0.5m		✓
ES2101105-024	07-Jan-2021 00:00	ABH-C7 0.5m		✓
ES2101105-029	12-Jan-2021 00:00	ABH-P4 0m		✓
ES2101105-037	08-Jan-2021 00:00	ABH-A5 1.5m	✓	
ES2101105-048	07-Jan-2021 00:00	ABH-C4 1.0m	✓	
ES2101105-062	11-Jan-2021 00:00	ABH-A4 1.0m	✓	
ES2101105-064	12-Jan-2021 00:00	ABH-A1 0.1m		✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	(On Hold) WATER No analysis requested	WATER - W-03T 15 Metals (Total) (NEPM)
ES2101105-044	07-Jan-2021 00:00	Rinsate (ABH-C7)		✓
ES2101105-045	08-Jan-2021 00:00	Rinsate (ABH-A5)	✓	
ES2101105-054	08-Jan-2021 00:00	Rinsate (ABH-C6)	✓	
ES2101105-059	11-Jan-2021 00:00	Rinsate (ABH-A3)	✓	
ES2101105-078	05-Jan-2021 00:00	Trip Spike	✓	
ES2101105-079	05-Jan-2021 00:00	Trip Spike	✓	
ES2101105-080	05-Jan-2021 00:00	Trip Spike	✓	
ES2101105-081	05-Jan-2021 00:00	Trip Blank	✓	
ES2101105-082	05-Jan-2021 00:00	Trip Blank	✓	

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **SOIL**

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

Method **Client Sample ID(s)**	**Container**	**Due for extraction**	**Due for analysis**	**Samples Received**		**Instructions Received**	
				Date	**Evaluation**	**Date**	**Evaluation**
EA002: pH (1:5)							
ABH-A4 1.0m	Soil Glass Jar - Unpreserved	18-Jan-2021	18-Jan-2021	13-Jan-2021	✓	19-Jan-2021	×
ABH-A5 1.5m	Soil Glass Jar - Unpreserved	15-Jan-2021	19-Jan-2021	13-Jan-2021	✓	19-Jan-2021	×
ABH-C4 1.0m	Soil Glass Jar - Unpreserved	14-Jan-2021	19-Jan-2021	13-Jan-2021	✓	19-Jan-2021	×

Requested Deliverables

ACCOUNTS PAYABLE		
- A4 - AU Tax Invoice (INV)	Email	Aus.Payable@arup.com
BRAD SCOTT		
- *AU Certificate of Analysis - NATA (COA)	Email	brad.scott@arup.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	brad.scott@arup.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	brad.scott@arup.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	brad.scott@arup.com
- A4 - AU Tax Invoice (INV)	Email	brad.scott@arup.com
- Chain of Custody (CoC) (COC)	Email	brad.scott@arup.com
- EDI Format - ENMRG (ENMRG)	Email	brad.scott@arup.com
- EDI Format - ESDAT (ESDAT)	Email	brad.scott@arup.com
results		
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	arup@esdat.com.au
- Chain of Custody (CoC) (COC)	Email	arup@esdat.com.au

ARUP **ADDRESS:**	Barrack Place, Level 5, 151 Clarence Street, Sydney NSW 2000	**LABORATORY:** ALS **ADDRESS:** 277-289 Woodpark Road, Smithfield NSW **LABORATORY CONTACT:** James Karagiannis	**LAB QUOTE NUMBER:** MEBQ/233/19 **PURCHASE ORDER NUMBER:** 277863 **TURNAROUND TIME:** Standard 5-7 days
PHONE NO:			
FAX NO:		**PHONE NO:** 02 9320 9320	
PROJECT NAME:	Kemps Creek	**PROJECT MANAGER:**	
PROJECT NO:	277863	**SAMPLER:**	**SIGNED:**

FOR LABORATORY USE ONLY

COMMENTS: Please forward SRN, COC, Lab Reports and Invoice to Brad Scott (Ph: 0402 146 646; E: brad.scott@arup.com)
Copy all reports to arup@esdat.com.au

LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
1	ABH-C3 0M	11/1/21		HDPE	1									
	" 0M			JAR	1									
2	" 0.5M			HDPE	1									
3	" 0.5M-D2			HDPE	1									
2	~~" 0.5m~~			~~JAR~~	1									
4	" 0.5M_D1	as		JAR	1									
3 ~~5~~	" 0.5M_D2			JAR	1									
6	" 1.0M	above		HDPE	1									
	" 1.0M			JAR	1									
7	" 1.5M			HDPE	1									
	" 1.5M			JAR	1									
8	" 2.0M			HDPE	1									
	" 2.0M			JAR	1									
9	ABH-P3 0.5M	12/1/21		HDPE	1									
	" 0.5M			JAR	1									
10	" 1.0M			HDPE	1									
	" 1.0M			JAR	1									
	" 1.5M	as		HDPE	1									
11	" 1.5M	above		JAR	1									
12	" 2.0M			HDPE	1									
			TOTAL NO SAMPLES:		20									

Environmental Division
Sydney
Work Order Reference
ES2101105

Telephone : + 61-2-8784 8555

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER: Luke J
RECEIVED BY: AJ
DATE: 12.1.21 TIME: 5:45pm SIGNATURE:
LABORATORY:
DATE: TIME: SIGNATURE:

RELINQUISHED BY:
DATE: TIME: SIGNATURE
RELINQUISHED BY:
DATE: TIME: SIGNATURE

14.1.21 emailed Brad.

ARUP

ADDRESS: Barrack Place,
Level 5, 151
Clarence Street,
Sydney NSW 2000

PHONE NO:
FAX NO:

LABORATORY: ALS
ADDRESS: 277-289 Woodpark Road, Smithfield NSW
LABORATORY CONTACT: James Karagiannis
PHONE NO: 02 9320 9320

LAB QUOTE NUMBER: MEBQ/233/19
PURCHASE ORDER NUMBER: 277863
TURNAROUND TIME: Standard 5-7 days

FOR LABORATORY USE ONLY

PROJECT NAME: Kemps Creek
PROJECT NO: 277863
PROJECT MANAGER:
SAMPLER:
SIGNED:

COMMENTS: Please forward SRN, COC, Lab Reports and Invoice to Brad Scott (Ph: 0402 146 646; E: brad.scott@arup.com)
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LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
13	ABH-P1 0M	12/1/21		HDPE	1									
	" 0M			JAR	1									
14	" 0.5M			HDPE	1									
	" 6.5M			JAR	1									
15	" 1.6M	as		HDPE	1									
	" 1.0M			JAR	1									
16	" 1.5M	above		JAR	1									
17	" 2.0M			HDPE	1									
	" 2.0M			JAR	1									
18	ABH-P2 0M	12/1/21		HDPE	1									
	" 0.M			JAR	1									
19	" 0.5M			HDPE	1									
	" 0.5M			JAR	1									
20	" 1.0M			HDPE	1									
	" 1.0M	as above		JAR	1									
21	" 1.5M			HDPE	1									
	" 1.5M			JAR	1									
22	" 2.0M			HDPE	1									
	" 2.0M			JAR	1									
			TOTAL NO SAMPLES:		19									

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER: Luke J
RECEIVED BY: HJ
DATE: 13.1.21 **TIME:** 5:45 pm **SIGNATURE:**
LABORATORY:
DATE: **TIME:** **SIGNATURE:**

RELINQUISHED BY:
DATE: **TIME:** **SIGNATURE**
RELINQUISHED BY:
DATE: **TIME:** **SIGNATURE**

ARUP
ADDRESS: Barrack Place,
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FAX NO:

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Road, Smithfield NSW
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LAB QUOTE NUMBER: MEBQ/233/19
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PROJECT NO: 277863
PROJECT MANAGER:
SAMPLER:
SIGNED:

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LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
23	ABH-C7 0m	7/1/21		HDPE	1									
	" 0M			JAR	1									
24	" 0.5M			HDPE	1									
	" 0.5M			JAR	1									
25	" 1.0M			HDPE	1									
	" 1.0m			JAR	1									
26	" 1.5M	as above		HDPE	1									
	" 1.5m			JAR	1									
27	" 2.0m			HDPE	1									
28	" 2.0m_D1			HDPE	1									
27	" 2.0m			JAR	1									
28	" 2.0m_D1			JAR	1									
29	ABH-P4 0m	12/1/21		HDPE	1									
	" 0m			JAR	1									
30	" 0.5m			HDPE	1									
	" 0.5m			JAR	1									
31	" 1.0m	as above		HDPE	1									
	" 1.0m			JAR	1									
32	" 1.5m			JAR	1									
33	ABH-C2 0.5m_D1	11/1/21		HDPE	1									
			TOTAL NO SAMPLES:		19									

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER: Luke J.
RECEIVED BY: HJ
DATE: 13.1.21 TIME: 5:45pm SIGNATURE:
LABORATORY:
DATE: TIME: SIGNATURE:

RELINQUISHED BY:
DATE: TIME: SIGNATURE
RELINQUISHED BY:
DATE: TIME: SIGNATURE

ARUP

ADDRESS: Barrack Place,
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Sydney NSW 2000

PHONE NO:
FAX NO:

LABORATORY: ALS
ADDRESS: 277-289 Woodpark Road, Smithfield NSW
LABORATORY CONTACT: James Karagiannis
PHONE NO: 02 9320 9320

LAB QUOTE NUMBER: MEBQ/233/19
PURCHASE ORDER NUMBER: 277863
TURNAROUND TIME: Standard 5-7 days

FOR LABORATORY USE ONLY

PROJECT NAME: Kemps Creek
PROJECT NO: 277863
PROJECT MANAGER:
SAMPLER:
SIGNED:

COMMENTS: Please forward SRN, COC, Lab Reports and Invoice to Brad Scott (Ph: 0402 146 646; E: brad.scott@arup.com)
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LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS										HOLD
34	ABH-A5 0M	8/1/21		HDPE	1										
	" 0M			JAR	1										
35	" 0.5M			HDPE	1										
	" 0.5M			JAR	1										
36	" 1M	as above		JAR	1										
37	" 1.5M			HDPE	1										
38	" 1.5M-2			HDPE	1										
37	" 1.5M			JAR	1										
76	" 2M			JAR	1										
39	ABH-C7 0m	7/1/21		JAR	1										
40	" 0.5M			JAR	1										
41	" 1.0M			HDPE	1										
	" 1.0M			JAR	1										
42	" 1.5M			HDPE	1										
	" 1.5M	as above		HDPE	1										
	" 1.5M			JAR	1										
	" 1.5M			JAR	1										
	" 2.0m			HDPE	1										
43	" 2.0M			HDPE	1										
	" 2.0m			JAR	1										

TOTAL NO SAMPLES: 9

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER: Luke J
RECEIVED BY: HJ
DATE: 13.1.21 TIME: 5:45pm SIGNATURE:
LABORATORY:
DATE: TIME: SIGNATURE:

RELINQUISHED BY:
DATE: TIME: SIGNATURE
RELINQUISHED BY:
DATE: TIME: SIGNATURE

ARUP

ADDRESS: Barrack Place, Level 5, 151 Clarence Street, Sydney NSW 2000
PHONE NO:
FAX NO:

LABORATORY: ALS
ADDRESS: 277-289 Woodpark Road, Smithfield NSW
LABORATORY CONTACT: James Karagiannis
PHONE NO: 02 9320 9320

LAB QUOTE NUMBER: MEBQ/233/19
PURCHASE ORDER NUMBER: 277863
TURNAROUND TIME: Standard 5-7 days

FOR LABORATORY USE ONLY

PROJECT NAME: Kemps Creek
PROJECT NO: 277863
PROJECT MANAGER:
SAMPLER:
SIGNED:

COMMENTS: Please forward SRN, COC, Lab Reports and Invoice to Brad Scott (Ph: 0402 146 646; E: brad.scott@arup.com)
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LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
44	Rinsate (ABH-C7)	7/1/21	–	–	3									
45	Rinsate (ABH-A5)	8/1/21	–	–	3									
			TOTAL NO SAMPLES:		6									

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER: Luke J
RECEIVED BY: HJ
DATE: 13.1.21 TIME: 5:45pm SIGNATURE:
LABORATORY:
DATE: TIME: SIGNATURE:

RELINQUISHED BY:
DATE: TIME: SIGNATURE
RELINQUISHED BY:
DATE: TIME: SIGNATURE

ARUP ADDRESS: PHONE NO: FAX NO:	Barrack Place, Level 5, 151 Clarence Street, Sydney NSW 2000	LABORATORY: ALS ADDRESS: 277-289 Woodpark Road, Smithfield NSW LABORATORY CONTACT: James Karagiannis PHONE NO: 02 9320 9320	LAB QUOTE NUMBER: MEBQ/233/19 PURCHASE ORDER NUMBER: 277863 TURNAROUND TIME: Standard 5-7 days
PROJECT NAME: PROJECT NO:	Kemps Creek 277863	PROJECT MANAGER: SAMPLER:	SIGNED:

FOR LABORATORY USE ONLY

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LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
46	ABH - ~~AB~~C4 0M	7/1/21		HDPE	1									
47	" 0.5M	"		"	1									
48	" 1.0M	"		"	1									
49	" 1.5M	"		"	1									
46	" 0M	"		JAR	1									
47	" 0.5M	"		"	1									
48	" 1.0M	"		"	1									
49	" 1.5M	"		"	1									
50	ABH - C6 0M	8/1/21		HDPE	1									
51	" 0.5M	"		"	1									
52	" 1.0M	"		"	1									
53	" 1.5M	"		"	1									
50	" 0M	"		JAR	1									
51	" 0.5M	"		"	1									
52	" 1.0M	"		"	1									
53	" 1.5M	"		"	1									
54	Rinsate (ABH - C6)	8/1/21		—	3									

TOTAL NO SAMPLES: 16

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER: Kelvin Lim
RECEIVED BY: HJ
DATE: 13.1.21 TIME: 5:45pm SIGNATURE:
LABORATORY:
DATE: TIME: SIGNATURE:

RELINQUISHED BY:
DATE: TIME: SIGNATURE
RELINQUISHED BY:
DATE: TIME: SIGNATURE

ARUP

ADDRESS: Barrack Place, Level 5, 151 Clarence Street, Sydney NSW 2000
PHONE NO:
FAX NO:

LABORATORY: ALS
ADDRESS: 277-289 Woodpark Road, Smithfield NSW
LABORATORY CONTACT: James Karagiannis
PHONE NO: 02 9320 9320

LAB QUOTE NUMBER: MEBQ/233/19
PURCHASE ORDER NUMBER: 277863
TURNAROUND TIME: Standard 5-7 days

FOR LABORATORY USE ONLY

PROJECT NAME: Kemps Creek
PROJECT NO: 277863
PROJECT MANAGER:
SAMPLER:
SIGNED:

COMMENTS: Please forward SRN, COC, Lab Reports and Invoice to Brad Scott (Ph: 0402 146 646; E: brad.scott@arup.com)
Copy all reports to arup@esdat.com.au

LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
55	AB4-A3 0m	11/1/21		HDPE	1									
56	" 0.5m	"		"	1									
57	" 1.0m	"		"	1									
58	" 1.5m	"		"	1									
55	" 0m	"		JAR	1									
56	" 0.5m	"		"	1									
57	" 1.0m	"		"	1									
58	" 1.5m	"		"	1									
59	Rinsate (AB4-A3)	"		-	4									
60	AB4-A4 0m	"		HDPE	1									
61	0.5m	"		"	1									
62	1.0m	"		"	1									
63	1.5m	"		"	1									
60	0m	"		JAR	1									
61	0.5m	"		"	1									
62	1.0m	"		"										
63	1.5m	"		"	1									
				TOTAL NO SAMPLES:	20									

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER: Kelvin Lin
RECEIVED BY: HJ
DATE: 13.1.21 TIME: 5:45 pm SIGNATURE:
LABORATORY:
DATE: TIME: SIGNATURE:

RELINQUISHED BY:
DATE: TIME: SIGNATURE
RELINQUISHED BY:
DATE: TIME: SIGNATURE

ARUP

ADDRESS:	Barrack Place, Level 5, 151 Clarence Street, Sydney NSW 2000	LABORATORY: ALS ADDRESS: 277-289 Woodpark Road, Smithfield NSW LABORATORY CONTACT: James Karagiannis PHONE NO: 02 9320 9320	LAB QUOTE NUMBER: MEBQ/233/19 PURCHASE ORDER NUMBER: 277863 TURNAROUND TIME: Standard 5-7 days	FOR LABORATORY USE ONLY
PHONE NO:				
FAX NO:				
PROJECT NAME:	Kemps Creek	PROJECT MANAGER:		
PROJECT NO:	277863	SAMPLER:	SIGNED:	

COMMENTS: Please forward SRN, COC, Lab Reports and Invoice to Brad Scott (Ph: 0402 146 646; E: brad.scott@arup.com)
Copy all reports to arup@esdat.com.au

LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
64	ABH - A1 0m	12/1/21		HDPE	1									
65	" 0.5m	"		"	1									
66	" 1.0m	"		"	1									
67	" 1.5m	"		"	1									
64	" 0m	"		JAR	1									
65	" 0.5m	"		"	1									
66	" 1.0m	"		"	1									
67	" 1.5m	"		"	1									
68	ABH - A2 0m	"		HDPE	1									
69	" 0.5m	"		"	1									
70	" 1.0m	"		"	1									
71	" 1.5m	"		"	1									
68	" 0m	"		JAR	1									
69	0.5m	"		"	1									
70	1.0m	"		"	1									
71	1.5m	"		"	1									
			TOTAL NO SAMPLES:		16									

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

Custody Seal ? Y N NA Samples Cold ? Y N NA Comments:	SAMPLER: Kevin Lim	RELINQUISHED BY: DATE: TIME: SIGNATURE
	RECEIVED BY: HJ DATE: 13.1.21 TIME: 5:45pm SIGNATURE:	RELINQUISHED BY: DATE: TIME: SIGNATURE
	LABORATORY: DATE: TIME: SIGNATURE:	

ARUP

ADDRESS: Barrack Place, Level 5, 151 Clarence Street, Sydney NSW 2000
PHONE NO:
FAX NO:

LABORATORY: ALS
ADDRESS: 277-289 Woodpark Road, Smithfield NSW
LABORATORY CONTACT: James Karagiannis
PHONE NO: 02 9320 9320

LAB QUOTE NUMBER: MEBQ/233/19
PURCHASE ORDER NUMBER: 277863
TURNAROUND TIME: Standard 5-7 days

FOR LABORATORY USE ONLY

PROJECT NAME: Kemps Creek
PROJECT NO: 277863
PROJECT MANAGER:
SAMPLER:
SIGNED:

COMMENTS: Please forward SRN, COC, Lab Reports and Invoice to Brad Scott (Ph: 0402 146 646; E: brad.scott@arup.com)
Copy all reports to arup@esdat.com.au

LAB ID	SAMPLE ID	DATE	MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NUMBER OF CONTAINERS									HOLD
72	ABH - A6 0m	12/1/21		HDPE	1									
73	" 0.5m	"		"	1									
74	" 1.0m	"		"	1									
75	" 1.5m	"		"	1									
72	" 0m	"		JAR	1									
73	" 0.5m	"		"	1									
74	" 1.0m	"		"	1									
75	" 1.5m	"		"	1									
	0.0m													
	TS 5/1/21													
	TS 5/1/21													
	TS 5/1/21													
	TB 5/1/21													
	TB = 5/1/21													

CONTAINER TYPE AND PRESERVATIVE CODES
J = Jar; H = HDPE, A = Amber Bottle; VH = HCl Preserved Vial; P = Plastic Bottle; N = Nitric Acid Preserved; S = Sulphuric Acid
P = Preserved; C = Sodium Hydroxide Preserved; B = Sterile Bottle; Z = Zinc Acetate Preserved; E = EDTA Preserved; O = Other

TOTAL NO SAMPLES: 8

Custody Seal ? Y N NA
Samples Cold ? Y N NA
Comments:

SAMPLER:
RECEIVED BY: AJ
DATE: 13.1.21 **TIME:** 5:45pm **SIGNATURE:**
LABORATORY:
DATE: **TIME:** **SIGNATURE:**

RELINQUISHED BY:
DATE: **TIME:** **SIGNATURE**
RELINQUISHED BY:
DATE: **TIME:** **SIGNATURE**

Helen Simpson

From: Brad Scott <Brad.Scott@arup.com>
Sent: Friday, 15 January 2021 12:29 PM
To: Helen Simpson
Cc: Peter Chuszno; Luke Johnstone; Kelvin Lim
Subject: RE: [EXTERNAL] - FW: ES2101105 COC with no analysis

Hi Helen, thanks for that.

I've added a sample from ABH-C1 to the updated analysis request below.

Please let me know if any issues.

Thanks
Brad

Sample ID	EP231X - PFAS (12)	EN34 - 1:5 Leach	S13 - OC/OP/PCB	EP202 - Phenoxyacetic acid herbicides	S3 - NEPM Suite 15 metals	NT-1S - Major cations (Ca, Mg, Na, K)	S-14A - PAH / Phenols	Corr. Sched 7 Soil on Concrete & steel piles (pH, sol. Sulfate, sol. Chloride)	W3 - NEPM Suite 15 metals	W18 - TRH(C6-C10) / BTEXN
ABH-A1-0.1	✓	✓	✓	✓	✓	✓	✓			

Environmental Division
Sydney
Work Order Reference
ES2101105

Telephone : + 61-2-8784 8555

	231X		S13	302	S3	NT13	S14A	CORR Sheet 7	W3	W18		
ABH-A2-1.0	✓	✓	✓	✓	✓	✓					70	
ABH-A3-0.5	✓	✓	✓	✓	✓	✓					96	
ABH-A4-1.0	✓	✓	✓	✓	✓	✓		✓			62	
ABH-A5-1.5	✓	✓	✓	✓	✓	✓		✓			37	
ABH-A6-0.5	✓	✓	✓	✓	✓	✓					73	
ABH-C1-0.5	✓	✓	✓	✓	✓	✓					?	
ABH-C2-0.5	✓	✓	✓	✓	✓	✓					33	ABH-C2 0.5m-D1
ABH-C3-0.5	✓	✓	✓	✓	✓	✓					2	
ABH-C4-1.0	✓	✓	✓	✓	✓	✓		✓			48	
ABH-C6-1.0	✓	✓	✓	✓	✓	✓					52	
ABH-C7-0.5	✓	✓	✓	✓	✓	✓	✓				24	
ABH-P1-1.0	✓	✓	✓	✓	✓	✓					15	
ABH-P2-0.5	✓	✓	✓	✓	✓	✓					19	
ABH-P3-0.5	✓	✓	✓	✓	✓	✓	✓				9	
ABH-P4-0.1	✓	✓	✓	✓	✓	✓	✓				29	
Rinsate (ABH-C7)									✓		44	
ABH-C3-0.5_D1	✓	✓	✓	✓	✓	✓					4	

Regards,

Brad Scott
Contaminated Land Lead | Environment & Resources

Arup
d: +61 3 9668 5933 m: +61 402 146 646

From: Helen Simpson <helen.simpson@alsglobal.com>
Sent: Friday, 15 January 2021 11:50 AM
To: Brad Scott <Brad.Scott@arup.com>
Cc: Peter Chuszno <Peter.Chuszno@arup.com>; Luke Johnstone <Luke.Johnstone@arup.com>; Kelvin Lim <Kelvin.Lim@arup.com>
Subject: [External] RE: [EXTERNAL] - FW: ES2101105 COC with no analysis

Thanks Brad,

I'll have the team line up the samples shortly and log it in. if there are any issues I'll let you know.

There was also another unmarked COC this I sent before this lot. Not sure if that's separate to this batch, see attached email.

Kind Regards,

Helen Simpson
Sample Admin, Environmental
Sydney

T +61 2 8784 8555
F +61 2 8784 8500
helen.simpson@alsglobal.com
277-289 Woodpark Road
Smithfield NSW 2164 AUSTRALIA

Subscribe

From: Brad Scott <Brad.Scott@arup.com>
Sent: Thursday, 14 January 2021 9:54 PM
To: Helen Simpson <helen.simpson@alsglobal.com>
Cc: Peter Chuszno <Peter.Chuszno@arup.com>; Luke Johnstone <Luke.Johnstone@arup.com>; Kelvin Lim <Kelvin.Lim@arup.com>
Subject: [EXTERNAL] - FW: ES2101105 COC with no analysis

Hi Helen,

Thanks for sending through the COCs. The updated analysis request is provided in the table below. Standard turnaround time for results.

Could you please confirm the following:

- Were any trip blank samples received?
- Were any samples received labelled as ABH-C1?

If there are any discrepancies with the requested analysis and sample containers received, please let me know as soon as possible.

Thanks
Brad

Sample ID	EP231X - PFAS (12)	EN34 - 1:5 Leach	S13 - OC/OP/PCB	EP202 - Phenoxyacetic acid herbicides	S3 - NEPM Suite 15 metals	NT-1S - Major cations (Ca, Mg, Na, K)	S-14A - PAH / Phenols	Corr. Sched 7 Soil on Concrete & steel piles (pH, sol. Sulfate, sol. Chloride)	W3 - NEPM Suite 15 metals	W18 - TRH(C6-C10) / BTEXN
ABH-A1-0.1	✓	✓	✓	✓	✓	✓	✓			
ABH-A2-1.0	✓	✓	✓	✓	✓	✓				
ABH-A3-0.5	✓	✓	✓	✓	✓	✓				
ABH-A4-1.0	✓	✓	✓	✓	✓	✓		✓		
ABH-A5-1.5	✓	✓	✓	✓	✓	✓		✓		
ABH-A6-0.5	✓	✓	✓	✓	✓	✓				
ABH-C2-0.5	✓	✓	✓	✓	✓	✓				
ABH-C3-0.5	✓	✓	✓	✓	✓	✓				
ABH-C4-1.0	✓	✓	✓	✓	✓	✓		✓		
ABH-C6-1.0	✓	✓	✓	✓	✓	✓				
ABH-C7-0.5	✓	✓	✓	✓	✓	✓	✓			
ABH-P1-1.0	✓	✓	✓	✓	✓	✓				
ABH-P2-0.5	✓	✓	✓	✓	✓	✓				

ABH-P3-0.5	✓	✓	✓	✓	✓	✓	✓			
ABH-P4-0.1	✓	✓	✓	✓	✓	✓	✓			
Rinsate (ABH-C7)									✓	
ABH-C3-0.5_D1	✓	✓	✓	✓	✓	✓				

Regards,

Brad Scott
Contaminated Land Lead | Environment & Resources

Arup
d: +61 3 9668 5933 m: +61 402 146 646

From: Helen Simpson <helen.simpson@alsglobal.com>
Sent: Thursday, 14 January 2021 10:14 AM
To: Brad Scott <Brad.Scott@arup.com>
Subject: [External] ES2101105 COC with no analysis

Hi Brad,

We have received the attached 9 pages of COCs with no analysis marked. Please send through analysis requirements when available.

Kind Regards,

Helen Simpson
Sample Admin, Environmental
Sydney

T +61 2 8784 8555
F +61 2 8784 8500
helen.simpson@alsglobal.com
277-289 Woodpark Road
Smithfield NSW 2164 AUSTRALIA

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EnviroMail™ 128 – Revised PFAS Bottle Requirements

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Helen Simpson

From: Brad Scott <Brad.Scott@arup.com>
Sent: Thursday, 14 January 2021 9:54 PM
To: Helen Simpson
Cc: Peter Chuszno; Luke Johnstone; Kelvin Lim
Subject: [EXTERNAL] - FW: ES2101105 COC with no analysis
Attachments: 14012021101148-0001.pdf

Hi Helen,

Thanks for sending through the COCs. The updated analysis request is provided in the table below. Standard turnaround time for results.

Could you please confirm the following:

- Were any trip blank samples received?
- Were any samples received labelled as ABH-C1?

If there are any discrepancies with the requested analysis and sample containers received, please let me know as soon as possible.

Thanks
Brad

Sample ID	EP231X - PFAS (12)	EN34 - 1:5 Leach	S13 - OC/OP/PCB	EP202 - Phenoxyacetic acid herbicides	S3 - NEPM Suite 15 metals	NT-1S - Major cations (Ca, Mg, Na, K)	S-14A - PAH / Phenols	Corr. Sched 7 Soil on Concrete & steel piles (pH, sol. Sulfate, sol. Chloride)	W3 - NEPM Suite 15 metals	W18 - TRH(C6-C10) / BTEXN
ABH-A1-0.1	✓	✓	✓	✓	✓	✓	✓			
ABH-A2-1.0	✓	✓	✓	✓	✓	✓				
ABH-A3-0.5	✓	✓	✓	✓	✓	✓				
ABH-A4-1.0	✓	✓	✓	✓	✓	✓		✓		
ABH-A5-1.5	✓	✓	✓	✓	✓	✓		✓		
ABH-A6-0.5	✓	✓	✓	✓	✓	✓				
ABH-C2-0.5	✓	✓	✓	✓	✓	✓				
ABH-C3-0.5	✓	✓	✓	✓	✓	✓				
ABH-C4-1.0	✓	✓	✓	✓	✓	✓		✓		
ABH-C6-1.0	✓	✓	✓	✓	✓	✓				
ABH-C7-0.5	✓	✓	✓	✓	✓	✓	✓			
ABH-P1-1.0	✓	✓	✓	✓	✓	✓				
ABH-P2-0.5	✓	✓	✓	✓	✓	✓				
ABH-P3-0.5	✓	✓	✓	✓	✓	✓	✓			
ABH-P4-0.1	✓	✓	✓	✓	✓	✓	✓			
Rinsate (ABH-C7)									✓	
ABH-C3-0.5_D1	✓	✓	✓	✓	✓	✓				

Regards,

Brad Scott
Contaminated Land Lead | Environment & Resources

Arup
d: +61 3 9668 5933 m: +61 402 146 646

From: Helen Simpson <helen.simpson@alsglobal.com>
Sent: Thursday, 14 January 2021 10:14 AM
To: Brad Scott <Brad.Scott@arup.com>
Subject: [External] ES2101105 COC with no analysis

Hi Brad,

We have received the attached 9 pages of COCs with no analysis marked. Please send through analysis requirements when available.

Kind Regards,

Helen Simpson
Sample Admin, Environmental
Sydney

T +61 2 8784 8555
F +61 2 8784 8500
helen.simpson@alsglobal.com
277-289 Woodpark Road
Smithfield NSW 2164 AUSTRALIA

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CERTIFICATE OF ANALYSIS

Work Order	: **ES2101105**	Page	: 1 of 21
Client	: **ARUP PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BRAD SCOTT	Contact	: Benjamin Comensoli
Address	: Level 5, 151 Clarence St, Sydney NSW 2000 Sydney	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 277863 Kemps Creek	Date Samples Received	: 13-Jan-2021 17:45
Order number	: 277863	Date Analysis Commenced	: 15-Jan-2021
C-O-C number	: ----	Issue Date	: 25-Jan-2021 16:37
Sampler	: ----		
Site	: ----		
Quote number	: MEBQ-233-19 PRIMARY WORK		
No. of samples received	: 76		
No. of samples analysed	: 16		

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

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, 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 Contact 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.

- EP202: Poor matrix spike recoveries due to matrix interferences.
- 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.
- 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.
- EG020: Positive result for sample ES2101105 #044 has been confirmed by reanalysis.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

			Sample ID	**ABH-C3 0.5m**	**ABH-C3 0.5m-D1**	**ABH-P3 0.5m**	**ABH-P1 1.0m**	**ABH-P2 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-002**	**ES2101105-004**	**ES2101105-009**	**ES2101105-015**	**ES2101105-019**
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**15.8**	**15.1**	**8.9**	**14.2**	**13.7**
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	**20**	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	**30**	<10	<10
Sodium	7440-23-5	10	mg/kg	**760**	**760**	**30**	**840**	**280**
Potassium	7440-09-7	10	mg/kg	<10	<10	**70**	<10	<10
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**6**	**6**	**9**	**5**	**10**
Barium	7440-39-3	10	mg/kg	**230**	**110**	**130**	**40**	**510**
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**14**	**14**	**21**	**13**	**14**
Cobalt	7440-48-4	2	mg/kg	**4**	**4**	**16**	<2	**2**
Copper	7440-50-8	5	mg/kg	**19**	**22**	**18**	**17**	**21**
Lead	7439-92-1	5	mg/kg	**10**	**11**	**28**	**7**	**14**
Manganese	7439-96-5	5	mg/kg	**45**	**53**	**1790**	**69**	**30**
Nickel	7440-02-0	2	mg/kg	**6**	**7**	**8**	**7**	**4**
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	**40**	**37**	**46**	**37**	**43**
Zinc	7440-66-6	5	mg/kg	**22**	**23**	**29**	**20**	**21**
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	<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
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<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
gamma-BHC	58-89-9	0.05	mg/kg	<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
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**ABH-C3 0.5m**	**ABH-C3 0.5m-D1**	**ABH-P3 0.5m**	**ABH-P1 1.0m**	**ABH-P2 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	**ES2101105-002**	**ES2101105-004**	**ES2101105-009**	**ES2101105-015**	**ES2101105-019**
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
^ **Total Chlordane (sum)**	----	0.05	mg/kg	<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
alpha-Endosulfan	959-98-8	0.05	mg/kg	<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
Dieldrin	60-57-1	0.05	mg/kg	<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
Endrin	72-20-8	0.05	mg/kg	<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
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	<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
Endrin aldehyde	7421-93-4	0.05	mg/kg	<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
4.4`-DDT	50-29-3	0.2	mg/kg	<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
Methoxychlor	72-43-5	0.2	mg/kg	<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
^ **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
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<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
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<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
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<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
Chlorfenvinphos	470-90-6	0.05	mg/kg	<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
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**ABH-C3 0.5m**	**ABH-C3 0.5m-D1**	**ABH-P3 0.5m**	**ABH-P1 1.0m**	**ABH-P2 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	**ES2101105-002**	**ES2101105-004**	**ES2101105-009**	**ES2101105-015**	**ES2101105-019**
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued								
Ethion	563-12-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<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
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	<0.5	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	<0.5	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	<0.5	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	----	<1	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	<0.5	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	<0.5	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	<0.5	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	<0.5	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	<0.5	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	<0.5	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	<0.5	----	----
Pentachlorophenol	87-86-5	2	mg/kg	----	----	<2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	<0.5	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg	----	----	<0.5	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-C3 0.5m**	**ABH-C3 0.5m-D1**	**ABH-P3 0.5m**	**ABH-P1 1.0m**	**ABH-P2 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-002**	**ES2101105-004**	**ES2101105-009**	**ES2101105-015**	**ES2101105-019**
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg	----	----	<0.5	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg	----	----	**0.6**	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg	----	----	**1.2**	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
2.4-DB	94-82-6	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
Dicamba	1918-00-9	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
Mecoprop	93-65-2	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
MCPA	94-74-6	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
2.4-DP	120-36-5	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
2.4-D	94-75-7	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
Triclopyr	55335-06-3	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
2.4.5-T	93-76-5	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
MCPB	94-81-5	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
Picloram	1918-02-1	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
Clopyralid	1702-17-6	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	----	<0.02	<0.02	<0.02
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	----	**0.0003**	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	----	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-C3 0.5m**	**ABH-C3 0.5m-D1**	**ABH-P3 0.5m**	**ABH-P1 1.0m**	**ABH-P2 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-002**	**ES2101105-004**	**ES2101105-009**	**ES2101105-015**	**ES2101105-019**
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	----	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**ABH-C3 0.5m**	**ABH-C3 0.5m-D1**	**ABH-P3 0.5m**	**ABH-P1 1.0m**	**ABH-P2 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	**ES2101105-002**	**ES2101105-004**	**ES2101105-009**	**ES2101105-015**	**ES2101105-019**
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	----	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	**0.0003**	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	----	**0.0003**	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	**0.0003**	<0.0002	<0.0002

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL)**			Sample ID	**ABH-C7 0.5m**	**ABH-P4 0m**	**ABH-A5 1.5m**	**ABH-C4 1.0m**	**ABH-C6 1.0m**
			Sampling date / time	07-Jan-2021 00:00	12-Jan-2021 00:00	08-Jan-2021 00:00	07-Jan-2021 00:00	08-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	**ES2101105-024**	**ES2101105-029**	**ES2101105-037**	**ES2101105-048**	**ES2101105-052**
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**----**	**----**	**7.6**	**5.9**	**----**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**14.1**	**8.4**	**16.1**	**14.9**	**12.6**
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**----**	**----**	**380**	**60**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	**----**	**----**	**1570**	**80**	**----**
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	**40**	**110**	**20**	<10	<10
Magnesium	7439-95-4	10	mg/kg	**470**	<10	**110**	**300**	**60**
Sodium	7440-23-5	10	mg/kg	**560**	**90**	**1130**	**190**	**400**
Potassium	7440-09-7	10	mg/kg	**320**	**40**	**110**	**410**	**80**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**8**	**11**	**8**	**6**
Barium	7440-39-3	10	mg/kg	**40**	**120**	**160**	**90**	**100**
Beryllium	7440-41-7	1	mg/kg	<1	<1	**1**	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**13**	**26**	**14**	**12**	**12**
Cobalt	7440-48-4	2	mg/kg	<2	**8**	**7**	**6**	**3**
Copper	7440-50-8	5	mg/kg	**11**	**38**	**37**	**16**	**13**
Lead	7439-92-1	5	mg/kg	**8**	**29**	**16**	**15**	**10**
Manganese	7439-96-5	5	mg/kg	**9**	**473**	**26**	**102**	**25**
Nickel	7440-02-0	2	mg/kg	**3**	**9**	**7**	**7**	**4**
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	**36**	**37**	**43**	**35**	**43**
Zinc	7440-66-6	5	mg/kg	**8**	**50**	**28**	**26**	**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
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-C7 0.5m**	**ABH-P4 0m**	**ABH-A5 1.5m**	**ABH-C4 1.0m**	**ABH-C6 1.0m**
			Sampling date / time	07-Jan-2021 00:00	12-Jan-2021 00:00	08-Jan-2021 00:00	07-Jan-2021 00:00	08-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-024**	**ES2101105-029**	**ES2101105-037**	**ES2101105-048**	**ES2101105-052**
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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
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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-C7 0.5m**	**ABH-P4 0m**	**ABH-A5 1.5m**	**ABH-C4 1.0m**	**ABH-C6 1.0m**
			Sampling date / time	07-Jan-2021 00:00	12-Jan-2021 00:00	08-Jan-2021 00:00	07-Jan-2021 00:00	08-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-024**	**ES2101105-029**	**ES2101105-037**	**ES2101105-048**	**ES2101105-052**
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued								
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
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	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-C7 0.5m**	**ABH-P4 0m**	**ABH-A5 1.5m**	**ABH-C4 1.0m**	**ABH-C6 1.0m**
			Sampling date / time	07-Jan-2021 00:00	12-Jan-2021 00:00	08-Jan-2021 00:00	07-Jan-2021 00:00	08-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-024**	**ES2101105-029**	**ES2101105-037**	**ES2101105-048**	**ES2101105-052**
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
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	<0.5	----	----	----
^ **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**	----	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	**0.0006**	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-C7 0.5m**	**ABH-P4 0m**	**ABH-A5 1.5m**	**ABH-C4 1.0m**	**ABH-C6 1.0m**
			Sampling date / time	07-Jan-2021 00:00	12-Jan-2021 00:00	08-Jan-2021 00:00	07-Jan-2021 00:00	08-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-024**	**ES2101105-029**	**ES2101105-037**	**ES2101105-048**	**ES2101105-052**
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	ABH-C7 0.5m	ABH-P4 0m	ABH-A5 1.5m	ABH-C4 1.0m	ABH-C6 1.0m
			Sampling date / time	07-Jan-2021 00:00	12-Jan-2021 00:00	08-Jan-2021 00:00	07-Jan-2021 00:00	08-Jan-2021 00:00
				ES2101105-024	**ES2101105-029**	**ES2101105-037**	**ES2101105-048**	**ES2101105-052**
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	<0.0002	**0.0006**	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	**0.0006**	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	**0.0006**	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-A3 0.5m**	**ABH-A4 1.0m**	**ABH-A1 0.1m**	**ABH-A2 1.0m**	**ABH-A6 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-056**	**ES2101105-062**	**ES2101105-064**	**ES2101105-070**	**ES2101105-073**
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	----	**7.3**	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	----	----	**12.9**	----	----
Moisture Content	----	1.0	%	**15.6**	**14.5**	----	**16.3**	**14.4**
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	----	**240**	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	----	**110**	----	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	**100**	**60**	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	**520**	**100**	**30**	**200**
Sodium	7440-23-5	10	mg/kg	**320**	**410**	**70**	**1270**	**390**
Potassium	7440-09-7	10	mg/kg	<10	**660**	**210**	<10	**240**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**9**	**8**	**6**	**8**
Barium	7440-39-3	10	mg/kg	**10**	**10**	**160**	**110**	**300**
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**16**	**25**	**18**	**16**	**20**
Cobalt	7440-48-4	2	mg/kg	<2	**6**	**16**	<2	**3**
Copper	7440-50-8	5	mg/kg	**11**	**14**	**23**	**13**	**18**
Lead	7439-92-1	5	mg/kg	**14**	**12**	**22**	**9**	**12**
Manganese	7439-96-5	5	mg/kg	**24**	**24**	**1030**	**16**	**82**
Nickel	7440-02-0	2	mg/kg	**3**	**8**	**15**	**3**	**7**
Selenium	7782-49-2	5	mg/kg	<5	**6**	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	**46**	**62**	**43**	**48**	**48**
Zinc	7440-66-6	5	mg/kg	**7**	**14**	**55**	**11**	**20**
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	<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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**ABH-A3 0.5m**	**ABH-A4 1.0m**	**ABH-A1 0.1m**	**ABH-A2 1.0m**	**ABH-A6 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	**ES2101105-056**	**ES2101105-062**	**ES2101105-064**	**ES2101105-070**	**ES2101105-073**
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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
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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL)**			Sample ID	**ABH-A3 0.5m**	**ABH-A4 1.0m**	**ABH-A1 0.1m**	**ABH-A2 1.0m**	**ABH-A6 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	**ES2101105-056**	**ES2101105-062**	**ES2101105-064**	**ES2101105-070**	**ES2101105-073**
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued								
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
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	<0.5	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	<0.5	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	<0.5	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	----	<1	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	<0.5	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	<0.5	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	<0.5	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	<0.5	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	<0.5	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	<0.5	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	<0.5	----	----
Pentachlorophenol	87-86-5	2	mg/kg	----	----	<2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	<0.5	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-A3 0.5m**	**ABH-A4 1.0m**	**ABH-A1 0.1m**	**ABH-A2 1.0m**	**ABH-A6 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-056**	**ES2101105-062**	**ES2101105-064**	**ES2101105-070**	**ES2101105-073**
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	<0.5	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg	----	----	<0.5	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg	----	----	<0.5	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg	----	----	**0.6**	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg	----	----	**1.2**	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	**0.0003**	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-A3 0.5m**	**ABH-A4 1.0m**	**ABH-A1 0.1m**	**ABH-A2 1.0m**	**ABH-A6 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-056**	**ES2101105-062**	**ES2101105-064**	**ES2101105-070**	**ES2101105-073**
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	**0.0070**	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	**0.0012**	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	**0.0003**	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**ABH-A3 0.5m**	**ABH-A4 1.0m**	**ABH-A1 0.1m**	**ABH-A2 1.0m**	**ABH-A6 0.5m**
			Sampling date / time	11-Jan-2021 00:00	11-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00	12-Jan-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES2101105-056**	**ES2101105-062**	**ES2101105-064**	**ES2101105-070**	**ES2101105-073**
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	**0.0088**	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	**0.0073**	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	**0.0085**	<0.0002	<0.0002

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	**Rinsate (ABH-C7)**	----	----	----	----
			Sampling date / time	07-Jan-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	**ES2101105-044**	--------	--------	--------	--------
				Result	----	----	----	----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	----	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.003**	----	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.001**	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.007**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.008**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order : **ES2101105**

Client : **ARUP PTY LTD**
Contact : BRAD SCOTT
Address : Level 5, 151 Clarence St, Sydney NSW 2000
Sydney
Telephone : ----
Project : 277863 Kemps Creek
Order number : 277863
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : MEBQ-233-19 PRIMARY WORK
No. of samples received : 76
No. of samples analysed : 16

Page : 1 of 17

Laboratory : Environmental Division Sydney
Contact : Benjamin Comensoli
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 13-Jan-2021
Date Analysis Commenced : 15-Jan-2021
Issue Date : 25-Jan-2021

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, 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

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 (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3464481)									
ES2101105-002	ABH-C3 0.5m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	230	220	0.00	0% - 20%
		EG005T: Chromium	7440-47-3	2	mg/kg	14	21	39.5	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	4	4	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	6	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	8	27.6	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	19	21	11.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	18	62.5	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	45	65	36.0	0% - 50%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	40	56	31.8	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	22	21	0.00	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
ES2101105-052	ABH-C6 1.0m	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	100	<10	164	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	12	12	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	3	3	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	6	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	13	11	14.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	10	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	25	22	11.1	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	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 (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3464481) - continued									
ES2101105-052	ABH-C6 1.0m	EG005T: Vanadium	7440-62-2	5	mg/kg	43	40	9.16	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	16	13	21.2	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
EA002: pH 1:5 (Soils) (QC Lot: 3466118)									
ES2101105-062	ABH-A4 1.0m	EA002: pH Value	----	0.1	pH Unit	7.3	7.4	1.63	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 3466966)									
ES2101466-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	5.8	5.7	0.00	0% - 20%
ES2101105-037	ABH-A5 1.5m	EA002: pH Value	----	0.1	pH Unit	7.6	7.6	0.00	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3464482)									
ES2101105-009	ABH-P3 0.5m	EA055: Moisture Content	----	0.1	%	8.9	9.2	4.08	No Limit
ES2101105-064	ABH-A1 0.1m	EA055: Moisture Content	----	0.1	%	12.9	14.3	10.2	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 3466968)									
ES2101466-002	Anonymous	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	90	100	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3466120)									
ES2101105-062	ABH-A4 1.0m	ED045G: Chloride	16887-00-6	10	mg/kg	110	160	32.6	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3466969)									
ES2101105-037	ABH-A5 1.5m	ED045G: Chloride	16887-00-6	10	mg/kg	1570	1700	7.58	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 3466967)									
ES2101105-037	ABH-A5 1.5m	ED093S: Magnesium	7439-95-4	10	mg/kg	110	140	20.0	0% - 50%
		ED093S: Potassium	7440-09-7	10	mg/kg	110	130	15.9	0% - 50%
ES2101105-070	ABH-A2 1.0m	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.00	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	30	20	0.00	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	1270	1200	5.25	0% - 20%
		ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.00	No Limit
ES2101105-037	ABH-A5 1.5m	ED093S: Calcium	7440-70-2	10	mg/kg	20	10	0.00	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	1130	1120	0.00	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3464480)									
ES2101105-002	ABH-C3 0.5m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES2101105-052	ABH-C6 1.0m	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 3464955)									
ES2101105-056	ABH-A3 0.5m	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES2101105-009	ABH-P3 0.5m	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3464956)									
ES2101105-056	ABH-A3 0.5m	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	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 (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3464956) - continued									
ES2101105-056	ABH-A3 0.5m	EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES2101105-009	ABH-P3 0.5m	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3464956)									
ES2101105-056	ABH-A3 0.5m	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	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 (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3464956) - continued									
ES2101105-056	ABH-A3 0.5m	EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES2101105-009	ABH-P3 0.5m	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3464957)									
ES2101105-009	ABH-P3 0.5m	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	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 (%)**	**Recovery Limits (%)**
EP075(SIM)A: Phenolic Compounds (QC Lot: 3464957) - continued									
ES2101105-009	ABH-P3 0.5m	EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3464957)									
ES2101105-009	ABH-P3 0.5m	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3465235)									
EM2100391-006	Anonymous	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.04	<0.04	0.00	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 (%)	Recovery Limits (%)
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3465235) - continued									
EM2100391-006	Anonymous	EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
ES2101105-048	ABH-C4 1.0m	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3465724)									
ES2101105-002	ABH-C3 0.5m	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
ES2101105-056	ABH-A3 0.5m	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3465724)									
ES2101105-002	ABH-C3 0.5m	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	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 (%)*	*Recovery Limits (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3465724) - continued									
ES2101105-002	ABH-C3 0.5m	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
ES2101105-056	ABH-A3 0.5m	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3465724)									
ES2101105-002	ABH-C3 0.5m	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES2101105-056	ABH-A3 0.5m	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	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 (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3465724) - continued									
ES2101105-056	ABH-A3 0.5m	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3465724)									
ES2101105-002	ABH-C3 0.5m	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES2101105-056	ABH-A3 0.5m	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 3475560)									
ES2101452-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.007	0.007	0.00	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.096	0.097	0.00	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.018	0.018	0.00	0% - 50%
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	0.002	0.003	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.058	0.060	2.76	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.007	0.007	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.453	0.450	0.670	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.008	0.009	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.541	0.547	1.23	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3475424)									
ES2101105-044	Rinsate (ABH-C7)	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EW2100259-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (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 Spike (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 (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3464481)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	97.2	88.0	113
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	91.4	65.0	136
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.5 mg/kg	105	70.0	130
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	102	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	104	68.0	132
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	86.4	83.0	117
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	100	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.1 mg/kg	97.9	82.0	119
EG005T: Manganese	7439-96-5	5	mg/kg	<5	590 mg/kg	94.8	83.0	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	93.5	80.0	120
EG005T: Selenium	7782-49-2	5	mg/kg	<5	4 mg/kg	105	70.0	130
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	104	75.0	125
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	81.1	66.0	133
ED040S: Soluble Major Anions (QCLot: 3466119)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	750 mg/kg	108	80.0	120
ED040S: Soluble Major Anions (QCLot: 3466968)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	750 mg/kg	87.2	80.0	120
ED045G: Chloride by Discrete Analyser (QCLot: 3466120)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	250 mg/kg	95.6	75.0	125
				<10	5000 mg/kg	102	79.0	117
ED045G: Chloride by Discrete Analyser (QCLot: 3466969)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	250 mg/kg	99.1	75.0	125
				<10	5000 mg/kg	106	79.0	117
ED093S: Soluble Major Cations (QCLot: 3466117)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	250 mg/kg	110	85.0	119
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	250 mg/kg	104	85.0	119
ED093S: Sodium	7440-23-5	10	mg/kg	<10	250 mg/kg	109	81.0	123
ED093S: Potassium	7440-09-7	10	mg/kg	<10	250 mg/kg	109	83.0	125
ED093S: Soluble Major Cations (QCLot: 3466967)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	250 mg/kg	95.4	85.0	119
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	250 mg/kg	92.3	85.0	119
ED093S: Sodium	7440-23-5	10	mg/kg	<10	250 mg/kg	94.1	81.0	123
ED093S: Potassium	7440-09-7	10	mg/kg	<10	250 mg/kg	92.3	83.0	125

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	*Laboratory Control Spike (LCS) Report*			
					Spike	*Spike Recovery (%)*	*Recovery Limits (%)*	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3464480)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.073 mg/kg	120	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3464955)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	113	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 3464956)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	101	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	101	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	96.8	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	107	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	103	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	104	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	106	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	104	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	104	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	102	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	102	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.6	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	99.0	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	108	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	86.7	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.5	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	83.2	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.9	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	79.4	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3464956)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	83.1	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	81.5	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	89.9	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	97.3	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	97.6	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	98.4	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	97.9	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	103	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	102	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	97.7	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	102	70.0	116

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3464956) - continued								
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.7	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	104	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	91.1	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	100	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	99.2	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	87.0	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	62.0	41.0	123
EP075(SIM)A: Phenolic Compounds (QCLot: 3464957)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	96.2	71.0	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	91.7	72.0	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	90.7	71.0	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	97.2	67.0	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	82.4	54.0	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	94.3	68.0	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	97.2	66.0	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	92.4	70.0	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	97.0	70.0	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	94.4	54.0	114
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	93.2	60.0	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	33.8	10.0	57.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3464957)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	96.3	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	97.5	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	102	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	100	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	97.2	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	95.9	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	99.7	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	101	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	89.8	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	93.6	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	92.9	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	94.4	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	96.2	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	91.8	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	84.5	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	90.9	63.0	121

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3465235)								
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	76.3	54.4	128
EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	84.8	45.5	130
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	82.0	51.7	135
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	81.5	60.0	130
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	82.1	56.8	131
EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	88.7	50.0	141
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	89.8	68.5	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	97.7	50.8	141
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	86.2	40.8	126
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	112	57.4	139
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	87.8	38.9	137
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	52.2	48.7	129
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	77.6	49.4	106
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	83.1	53.2	128
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3465724)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.4	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.0	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.8	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.0	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	111	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3465724)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	79.8	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	75.6	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.6	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.2	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.6	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	115	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	79.6	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3465724)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	116	71.6	129
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	77.9	69.8	131

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3465724) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.6	68.7	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	91.0	65.1	134
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	115	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3465724)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	77.2	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	77.6	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	108	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	97.6	69.2	143

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EG020T: Total Metals by ICP-MS (QCLot: 3475560)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	82.0	114
EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	97.8	79.0	119
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	103	84.0	116
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	103	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	86.0	116
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	98.9	84.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	100	85.0	115
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.7	85.0	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.7	84.0	116
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	110	68.0	126
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	106	85.0	113
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	101	79.0	117
EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	104	75.0	129
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3475424)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.3	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**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3464481)							
ES2101105-002	ABH-C3 0.5m	EG005T: Arsenic	7440-38-2	50 mg/kg	89.1	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.4	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	97.0	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	94.7	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	95.8	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	91.9	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	95.7	66.0	133
ED045G: Chloride by Discrete Analyser (QCLot: 3466120)							
ES2101105-062	ABH-A4 1.0m	ED045G: Chloride	16887-00-6	2500 mg/kg	106	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3466969)							
ES2101105-037	ABH-A5 1.5m	ED045G: Chloride	16887-00-6	250 mg/kg	# Not Determined	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3464480)							
ES2101105-002	ABH-C3 0.5m	EG035T: Mercury	7439-97-6	5 mg/kg	70.4	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3464955)							
ES2101105-009	ABH-P3 0.5m	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	116	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 3464956)							
ES2101105-009	ABH-P3 0.5m	EP068: gamma-BHC	58-89-9	0.5 mg/kg	76.6	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	85.7	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	96.2	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	102	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	94.1	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	91.5	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3464956)							
ES2101105-009	ABH-P3 0.5m	EP068: Diazinon	333-41-5	0.5 mg/kg	87.9	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	83.9	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	93.2	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	83.8	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	77.0	70.0	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3464957)							
ES2101105-009	ABH-P3 0.5m	EP075(SIM): Phenol	108-95-2	10 mg/kg	92.6	70.0	130
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	95.8	70.0	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	85.6	60.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	92.6	70.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	57.1	20.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3464957)							
ES2101105-009	ABH-P3 0.5m						

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	*SpikeRecovery(%)*	*Recovery Limits (%)*	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3464957) - continued							
ES2101105-009	ABH-P3 0.5m	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	94.7	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	99.0	70.0	130
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3465235)							
EM2100391-006	Anonymous	EP202: Mecoprop	93-65-2	0.1 mg/kg	# 55.8	60.0	140
		EP202: MCPA	94-74-6	0.1 mg/kg	# 47.4	57.0	143
		EP202: 2.4-D	94-75-7	0.1 mg/kg	# 59.8	68.0	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	59.6	51.0	145
		EP202: 2.4.5-T	93-76-5	0.1 mg/kg	67.6	57.0	142
		EP202: Picloram	1918-02-1	0.1 mg/kg	# 42.4	49.0	138
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	49.8	49.0	149
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3465724)							
ES2101105-002	ABH-C3 0.5m	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	103	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	103	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	89.6	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	117	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	105	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	119	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3465724)							
ES2101105-002	ABH-C3 0.5m	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	81.4	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	98.4	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	114	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	104	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	114	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	116	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	108	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	119	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	115	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	105	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	102	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3465724)							
ES2101105-002	ABH-C3 0.5m	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	121	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	119	71.6	129
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	104	69.8	131
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	114	68.7	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	104	65.1	134

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3465724) - continued							
ES2101105-002	ABH-C3 0.5m	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	96.0	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	116	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3465724)							
ES2101105-002	ABH-C3 0.5m	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	96.4	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	107	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	112	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	102	69.2	143

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 3475560)							
ES2101558-003	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	87.1	70.0	130
		EG020A-T: Beryllium	7440-41-7	1 mg/L	89.0	70.0	130
		EG020A-T: Barium	7440-39-3	1 mg/L	90.2	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	90.9	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	90.9	70.0	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	84.0	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	86.8	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	86.7	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	91.1	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	85.7	70.0	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	91.8	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	85.8	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3475424)							
ES2101428-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	74.4	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2101105**	Page	: 1 of 12
Client	: **ARUP PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BRAD SCOTT	Telephone	: +61-2-8784 8555
Project	: 277863 Kemps Creek	Date Samples Received	: 13-Jan-2021
Site	: ----	Issue Date	: 25-Jan-2021
Sampler	: ----	No. of samples received	: 76
Order number	: 277863	No. of samples analysed	: 16

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.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	ES2101105--037	ABH-A5 1.5m	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP202A: Phenoxyacetic Acid Herbicides by LCMS	EM2100391--006	Anonymous	**Mecoprop**	93-65-2	55.8 %	60.0-140%	**Recovery less than lower data quality objective**
EP202A: Phenoxyacetic Acid Herbicides by LCMS	EM2100391--006	Anonymous	**MCPA**	94-74-6	47.4 %	57.0-143%	**Recovery less than lower data quality objective**
EP202A: Phenoxyacetic Acid Herbicides by LCMS	EM2100391--006	Anonymous	**2.4-D**	94-75-7	59.8 %	68.0-139%	**Recovery less than lower data quality objective**
EP202A: Phenoxyacetic Acid Herbicides by LCMS	EM2100391--006	Anonymous	**Picloram**	1918-02-1	42.4 %	49.0-138%	**Recovery less than lower data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA002: pH 1:5 (Soils)						
Soil Glass Jar - Unpreserved ABH-C4 1.0m	18-Jan-2021	14-Jan-2021	**4**	----	----	----
Soil Glass Jar - Unpreserved ABH-A5 1.5m	18-Jan-2021	15-Jan-2021	**3**	----	----	----

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	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container / *Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*

Matrix: **SOIL**

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

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
***Container** / Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002) ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	14-Jan-2021	✗	**19-Jan-2021**	19-Jan-2021	✓
Soil Glass Jar - Unpreserved (EA002) ABH-A5 1.5m	**08-Jan-2021**	**18-Jan-2021**	15-Jan-2021	✗	**19-Jan-2021**	19-Jan-2021	✓
Soil Glass Jar - Unpreserved (EA002) ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	18-Jan-2021	✓	**18-Jan-2021**	18-Jan-2021	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**----**	----	----	**15-Jan-2021**	21-Jan-2021	✓
Soil Glass Jar - Unpreserved (EA055) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**----**	----	----	**15-Jan-2021**	22-Jan-2021	✓
Soil Glass Jar - Unpreserved (EA055) ABH-C3 0.5m, ABH-C3 0.5m-D1, ABH-A3 0.5m, ABH-A4 1.0m	**11-Jan-2021**	**----**	----	----	**15-Jan-2021**	25-Jan-2021	✓
Soil Glass Jar - Unpreserved (EA055) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**----**	----	----	**15-Jan-2021**	26-Jan-2021	✓
ED040S : Soluble Sulfate by ICPAES							
Soil Glass Jar - Unpreserved (ED040S) ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	04-Feb-2021	✓	**19-Jan-2021**	15-Feb-2021	✓
Soil Glass Jar - Unpreserved (ED040S) ABH-A5 1.5m	**08-Jan-2021**	**18-Jan-2021**	05-Feb-2021	✓	**19-Jan-2021**	15-Feb-2021	✓
Soil Glass Jar - Unpreserved (ED040S) ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	08-Feb-2021	✓	**18-Jan-2021**	15-Feb-2021	✓
ED045G: Chloride by Discrete Analyser							
Soil Glass Jar - Unpreserved (ED045G) ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	04-Feb-2021	✓	**19-Jan-2021**	15-Feb-2021	✓
Soil Glass Jar - Unpreserved (ED045G) ABH-A5 1.5m	**08-Jan-2021**	**18-Jan-2021**	05-Feb-2021	✓	**19-Jan-2021**	15-Feb-2021	✓
Soil Glass Jar - Unpreserved (ED045G) ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	08-Feb-2021	✓	**18-Jan-2021**	15-Feb-2021	✓

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*
ED093S: Soluble Major Cations							
Soil Glass Jar - Unpreserved (ED093S) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	06-Jul-2021	✓	**19-Jan-2021**	06-Jul-2021	✓
Soil Glass Jar - Unpreserved (ED093S) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	07-Jul-2021	✓	**19-Jan-2021**	07-Jul-2021	✓
Soil Glass Jar - Unpreserved (ED093S) ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	10-Jul-2021	✓	**18-Jan-2021**	10-Jul-2021	✓
Soil Glass Jar - Unpreserved (ED093S) ABH-C3 0.5m, ABH-C3 0.5m-D1, ABH-A3 0.5m	**11-Jan-2021**	**18-Jan-2021**	10-Jul-2021	✓	**19-Jan-2021**	10-Jul-2021	✓
Soil Glass Jar - Unpreserved (ED093S) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**18-Jan-2021**	11-Jul-2021	✓	**19-Jan-2021**	11-Jul-2021	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**15-Jan-2021**	06-Jul-2021	✓	**19-Jan-2021**	06-Jul-2021	✓
Soil Glass Jar - Unpreserved (EG005T) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**15-Jan-2021**	07-Jul-2021	✓	**19-Jan-2021**	07-Jul-2021	✓
Soil Glass Jar - Unpreserved (EG005T) ABH-C3 0.5m, ABH-C3 0.5m-D1, ABH-A3 0.5m, ABH-A4 1.0m	**11-Jan-2021**	**15-Jan-2021**	10-Jul-2021	✓	**19-Jan-2021**	10-Jul-2021	✓
Soil Glass Jar - Unpreserved (EG005T) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**15-Jan-2021**	11-Jul-2021	✓	**19-Jan-2021**	11-Jul-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**15-Jan-2021**	04-Feb-2021	✓	**19-Jan-2021**	04-Feb-2021	✓
Soil Glass Jar - Unpreserved (EG035T) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**15-Jan-2021**	05-Feb-2021	✓	**19-Jan-2021**	05-Feb-2021	✓
Soil Glass Jar - Unpreserved (EG035T) ABH-C3 0.5m, ABH-C3 0.5m-D1, ABH-A3 0.5m, ABH-A4 1.0m	**11-Jan-2021**	**15-Jan-2021**	08-Feb-2021	✓	**19-Jan-2021**	08-Feb-2021	✓
Soil Glass Jar - Unpreserved (EG035T) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**15-Jan-2021**	09-Feb-2021	✓	**19-Jan-2021**	09-Feb-2021	✓

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*
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	21-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP066) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	22-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP066) ABH-C3 0.5m, ABH-A3 0.5m, ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	25-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP066) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**18-Jan-2021**	26-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	21-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP068) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	22-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP068) ABH-C3 0.5m, ABH-A3 0.5m, ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	25-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP068) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**18-Jan-2021**	26-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	21-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP068) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	22-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP068) ABH-C3 0.5m, ABH-A3 0.5m, ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	25-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP068) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**18-Jan-2021**	26-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓

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

Method		*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)			*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP075(SIM)A: Phenolic Compounds								
Soil Glass Jar - Unpreserved (EP075(SIM)) ABH-C7 0.5m		**07-Jan-2021**	**18-Jan-2021**	21-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) ABH-P3 0.5m, ABH-A1 0.1m	ABH-P4 0m,	**12-Jan-2021**	**18-Jan-2021**	26-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM)) ABH-C7 0.5m		**07-Jan-2021**	**18-Jan-2021**	21-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) ABH-P3 0.5m, ABH-A1 0.1m	ABH-P4 0m,	**12-Jan-2021**	**18-Jan-2021**	26-Jan-2021	✓	**19-Jan-2021**	27-Feb-2021	✓
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
Soil Glass Jar - Unpreserved (EP202) ABH-C7 0.5m,	ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	21-Jan-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP202) ABH-A5 1.5m,	ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	22-Jan-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP202) ABH-C3 0.5m, ABH-A4 1.0m	ABH-A3 0.5m,	**11-Jan-2021**	**18-Jan-2021**	25-Jan-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP202) ABH-P3 0.5m, ABH-P2 0.5m, ABH-A1 0.1m, ABH-A6 0.5m	ABH-P1 1.0m, ABH-P4 0m, ABH-A2 1.0m,	**12-Jan-2021**	**18-Jan-2021**	26-Jan-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) ABH-C7 0.5m,	ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	06-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-A5 1.5m,	ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	07-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-C3 0.5m, ABH-A4 1.0m	ABH-A3 0.5m,	**11-Jan-2021**	**18-Jan-2021**	10-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-P3 0.5m, ABH-P2 0.5m, ABH-A1 0.1m, ABH-A6 0.5m	ABH-P1 1.0m, ABH-P4 0m, ABH-A2 1.0m,	**12-Jan-2021**	**18-Jan-2021**	11-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓

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*
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) ABH-C7 0.5m,	ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	06-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-A5 1.5m,	ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	07-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-C3 0.5m, ABH-A4 1.0m	ABH-A3 0.5m,	**11-Jan-2021**	**18-Jan-2021**	10-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-P3 0.5m, ABH-P2 0.5m, ABH-A1 0.1m, ABH-A6 0.5m	ABH-P1 1.0m, ABH-P4 0m, ABH-A2 1.0m,	**12-Jan-2021**	**18-Jan-2021**	11-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) ABH-C7 0.5m,	ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	06-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-A5 1.5m,	ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	07-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-C3 0.5m, ABH-A4 1.0m	ABH-A3 0.5m,	**11-Jan-2021**	**18-Jan-2021**	10-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-P3 0.5m, ABH-P2 0.5m, ABH-A1 0.1m, ABH-A6 0.5m	ABH-P1 1.0m, ABH-P4 0m, ABH-A2 1.0m,	**12-Jan-2021**	**18-Jan-2021**	11-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) ABH-C7 0.5m,	ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	06-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-A5 1.5m,	ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	07-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-C3 0.5m, ABH-A4 1.0m	ABH-A3 0.5m,	**11-Jan-2021**	**18-Jan-2021**	10-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-P3 0.5m, ABH-P2 0.5m, ABH-A1 0.1m, ABH-A6 0.5m	ABH-P1 1.0m, ABH-P4 0m, ABH-A2 1.0m,	**12-Jan-2021**	**18-Jan-2021**	11-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓

Matrix: **SOIL**

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

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) ABH-C7 0.5m, ABH-C4 1.0m	**07-Jan-2021**	**18-Jan-2021**	06-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-A5 1.5m, ABH-C6 1.0m	**08-Jan-2021**	**18-Jan-2021**	07-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-C3 0.5m, ABH-A3 0.5m, ABH-A4 1.0m	**11-Jan-2021**	**18-Jan-2021**	10-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓
HDPE Soil Jar (EP231X) ABH-P3 0.5m, ABH-P1 1.0m, ABH-P2 0.5m, ABH-P4 0m, ABH-A1 0.1m, ABH-A2 1.0m, ABH-A6 0.5m	**12-Jan-2021**	**18-Jan-2021**	11-Jul-2021	✓	**18-Jan-2021**	27-Feb-2021	✓

Matrix: **WATER**

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

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) Rinsate (ABH-C7)	**07-Jan-2021**	**22-Jan-2021**	06-Jul-2021	✓	**22-Jan-2021**	06-Jul-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) Rinsate (ABH-C7)	**07-Jan-2021**	**----**	----	----	**22-Jan-2021**	04-Feb-2021	✓

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)							
Cations - soluble by ICP-AES	ED093S	3	15	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride Soluble By Discrete Analyser	ED045G	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	3	13	**23.08**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Cations - soluble by ICP-AES	ED093S	2	15	**13.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride Soluble By Discrete Analyser	ED045G	4	3	**133.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Cations - soluble by ICP-AES	ED093S	2	15	**13.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride Soluble By Discrete Analyser	ED045G	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	2	6	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	2	3	**66.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Matrix Spikes (MS) - Continued							
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	15	**6.67**	**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	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	**25.00**	**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*
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Major Anions - Soluble	ED040S	SOIL	In house: Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.
Cations - soluble by ICP-AES	ED093S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. 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-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, 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)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	SOIL	In house: LCMS (Electrospray in negative mode). Residues of acid herbicides are extracted from soil samples under the alkaline condition. An aliquot of the alkaline aqueous phase is taken and acidified before a SPE cleanup. After eluting off from the SPE cartridge, residues of acid herbicides are dissolved in HPLC mobile phase prior to instrument analysis.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
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 AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Extraction for Phenoxy Acid Herbicides in Soils.	EP202-PR	SOIL	In-House: Alkaline extract followed by SPE clean up of acidified portion of the sample extract.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
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)

Appendix B

SYD05-06-07_Y-R-0005 Hydrogeological Assessment Report

Memorandum

To	Confidential	Date 16 April 2021
Copies	Linda Slechta, Michael Rosenberg	Reference number 277863-00
From	Arup	File reference SYD05-06-07_Y-R-0005 Hydrogeological Assessment Report
Subject	Technical Memo – Hydrogeological Assessment Report	

1 Introduction

1.1 Purpose of this memo

The purpose of this memo is to support the submission of the Environmental Impact Statement required for the development of a Data Centre at 757 – 769 Mamre Road, Kemps Creek. As such, groundwater-related issues to the development will be addressed and discussed in this memo. This memo supplements the overarching parent Geotechnical Assessment Report (SYD05-06-07_Y-R-0003) in support of the Environmental Impact Statement. Therefore, the site context and the description of the proposed development will not be repeated herein.

1.2 SEARs and DCP requirements relevant to this memo

Table 1-1 identifies the SEARs and DCP requirements which are relevant to this technical assessment.

Table 1-1: SEARs and DCP requirements for Hydrogeology

SEARs relevant to this technical memo	Where addressed in this technical memo
Assessment of potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby.	Section 4.6, Section 5
Agency comments	
DPIE – The EIS must map the following features relevant to water and soils including: a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).	Section 4

b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method). c. Wetlands as described in s4.2 of the Biodiversity Assessment Method. d. Groundwater. e. Groundwater dependent ecosystems f. Proposed intake and discharge locations	
DPIE - The EIS must describe background conditions for any water resource likely to be affected by the development, including: a. Existing surface and groundwater. b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations. c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters. d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government. e. Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www.environment.nsw.gov.au/research-andpublications/publications-search/risk-based-framework-for-considering-waterwayhealth-outcomes-in-strategic-land-use-planning"	Section 4
The EIS must assess the impact of the development on hydrology, including: a. Water balance including quantity, quality and source. b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas. c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems. d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches). e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water. f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options. g. Identification of proposed monitoring of hydrological attributes. "	Section 5
DCP Requirements	
(Salinity – Section 2.9) – Control 5: Groundwater recharge shall be minimised.	Section 5
(Salinity – Section 2.9) – Control 8: Construction techniques shall be employed that prevent structural damage to the	Section 5

development as a result of salinity (see Building in a Saline Environment). For example, building footings shall be constructed so as not to impede groundwater movement and building materials that are resistant to salt effects shall be used.	
(Riparian Zones – Section 2.5) – Control 5: Existing flows of surface and groundwater should not be altered through construction of channelled flows or the redirection or interruption of flows,	Section 5

2 Policy and planning context

1. **Policy**
    - NSW State Groundwater Policy Framework Document 1997
    - NSW State Groundwater Quality Protection Policy 1998
    - NSW Aquifer Interference Policy 2012
    - Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011
    - Water Management Act 2000
    - Water Act 1912
2. **Guidelines**
    - National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia 2000
    - Risk Assessment Guidelines for Groundwater Dependent Ecosystems 2012
    - NSW State Groundwater Dependent Ecosystems Policy 2002
3. **Draft Mamre Road Precinct Development Control Plan (DCP)**

3 Methodology

This Chapter outlines the methodology used to define the baseline and undertake the environmental assessment of potential impacts of the proposal on groundwater including definition of the study area used as the basis of the assessment.

The scope work was as follows:

- Review of project documentation and existing investigation reports.
- Review of publicly available groundwater and surface water information.
- Development of a conceptual groundwater model for the site.
- Review of the proposed development and evaluation of potential interactions with the groundwater environment.

- Assessment of potential impacts to the groundwater environment or groundwater receptors during operational.
- Development of proposed remedial and mitigation measures for the project to minimise or mitigate risks to the groundwater environment, quality or receptors.

The following results from site-specific investigations have been used:

- Groundwater level monitoring from the site piezometer network.
- Bore logs

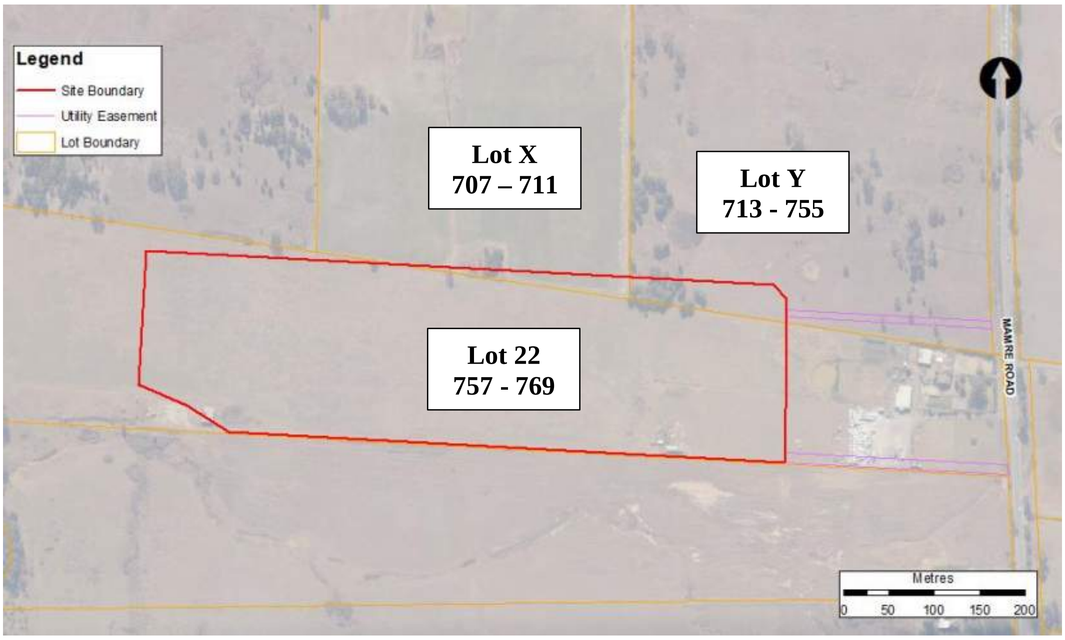
3.1 Study area

The study area of this assessment encompass the site boundary, which is part of three allotments, as shown in Figure 1 and listed in Table 1.

Table 1: Allotments within which the study area is located.

Street Address	Legal Description
707 – 711 Mamre Road, Kemps Creek	Lot X DP 421633
713 – 755 Mamre Road, Kemps Creek	Lot Y DP 421633
757 – 769 Mamre Road, Kemps Creek	Lot 22 DP 258414

Figure 1: Study area



4 Existing environment

4.1 Climate

Climate records for weather station 067019 (Prospect Reservoir), located several kilometres away, indicates a mean annual rainfall of 877mm (1887 to 2021) and mean annual pan evaporation of 1319mm (1965 to 2018). Monthly averages indicate a slight to moderate soil moisture deficit occurs from August to April inclusive.

4.2 Geology

The geology of the site consists of (in stratigraphic order):

- Alluvium (associated with South Creek) and Residual Soils (associated with shale)
- Bringelly Shale of the Wianamatta Group, described as shale, carbonaceous claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff.

Groundwater is present in both units.

4.3 Surface Water

The main surface drainage feature in the area is South Creek, located west of the western site boundary. Costin Roe (2019) report that topographic grades vary from 0.5% to 2.5%, with the grades becoming flatter moving westerly away from Mamre Road, towards South Creek. The current land-use is predominately rural and rural-residential.

Singh et al (2009) report an overall estimated average runoff volume for the South Creek catchment of 90.7 GL/year (248 ML/day) between 1992 and 2006, however the creek accepts various discharges such as effluent release from five sewage treatment plants in the lower parts of the catchment, and around 20 other activities licensed for discharges to waterways, including the Rouse Hill development area, an abattoir, dairies, swimming pools, golf clubs and farm production (Rae, 2007).

The elevation of the creek invert opposite the subject site is not known accurately. A dense Lidar DEM suggests the creek invert adjacent to the site is at or below 28mAHD; this approximate topographic level is prevalent in the creek in this reach and is thought to be influenced by the water level in the creek at the time the LiDAR survey was undertaken.

4.4 Groundwater

Figure 2 shows the interpolated water table for the area based on piezometer readings for the subject site, and other piezometers installed nearby for the previous EIS. The water table is approximately representative of late 2020.

Groundwater flow direction is from high ground in the east, west towards South Creek. The large water impoundment located just north of the central part of the northern site boundary was observed from aerial photographs to be intermittently dry.

Figure 3 is a cross-section through the site, showing the interpolated water table. The water table occurs mainly in the residual soil. Hydraulic head in the rock falls to slightly below the water table on the western extremity of the site, as South Creek is approached.

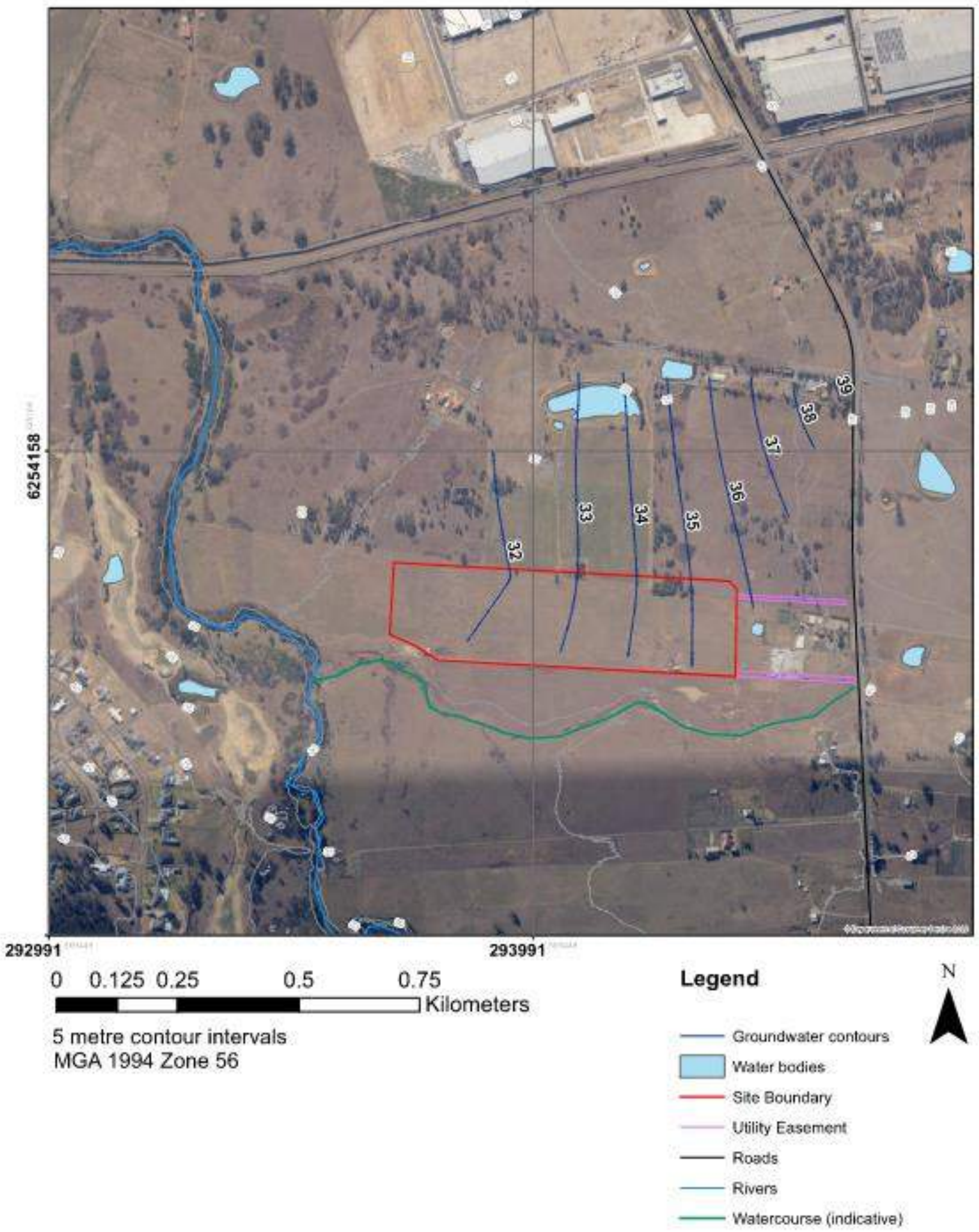


Figure 2. Interpolated water table for the site.

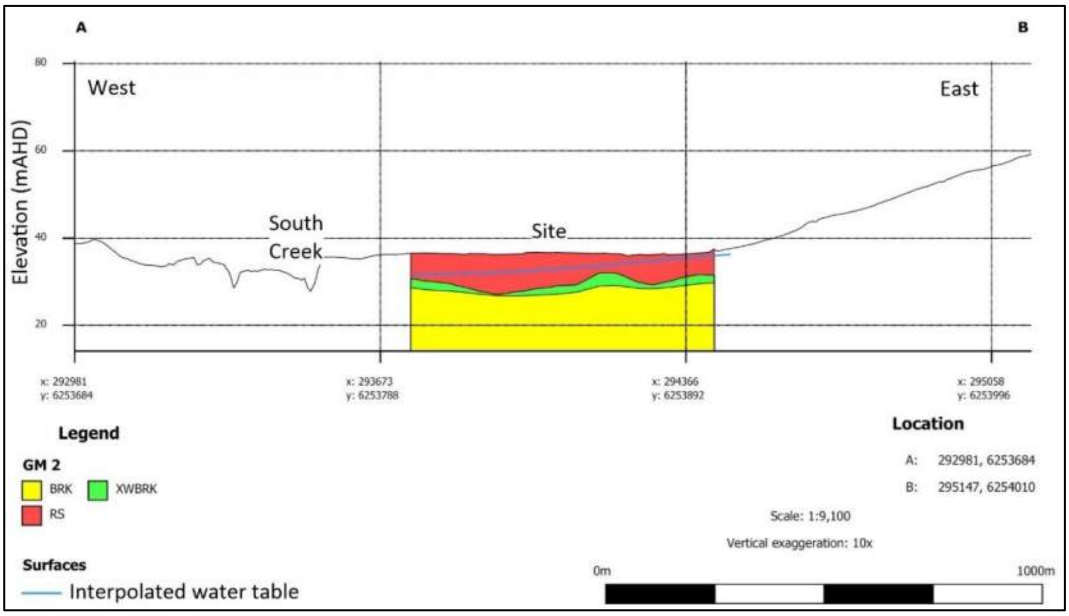


Figure 3. Hydrogeological cross-section.

4.5 Conceptual Model

The groundwater system is recharged by rainfall, with a catchment divide a short distance to the east of mapped area. Discharge mainly occurs as baseflow to South Creek. Rainfall recharge is likely to be higher for the site compared to typical suburban settings.

4.6 Groundwater-Dependent Ecosystems

CTEnvironmental (2018) provide a discussion on groundwater-dependent ecosystems (GDE) for the larger site considered for Altis Fraser, within which is located the subject site. That report indicates that for the wider area, groundwater dependent ecosystems (GDE) are present however their distribution is primarily limited to the South Creek corridor. South Creek is mapped as an aquatic GDE and is considered as having a high likelihood of groundwater dependence. The report interprets that groundwater plays a part at maintaining baseflow however the upstream urban and agricultural land use will significantly increase run-off and is likely to be the major contributor of flow in South Creek.

CTEnvironmental (2018) reports that Terrestrial GDE is mapped within the South Creek corridor which is also considered as having a high likelihood of groundwater dependence. The extent of this GDE corresponds with the distribution of PCT 835 - Forest Red Gum – Rough -barked Apple grassy woodland on alluvial flats. They report that most of this GDE and the associated PCT are located outside the larger development footprint (encompassing the subject property and other areas) and therefore is unlikely to be affected by the proposed development. They report, however, that a small portion appears to lie within the south west corner of the development footprint (potentially on the subject site) which require an accurate ground truthing at a later stage of the approvals process.

CTEnvironmental (2018) reports that an additional patch of terrestrial GDE is mapped in the southern portion of the development footprint however this is considered to have low potential of being groundwater dependant. This patch of GDE corresponds with a small isolated and underscrubbed patch of PCT 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain.

5 Assessment of potential construction impacts

Preliminary construction plans available at the time of writing indicate that with respect to groundwater, the following components of the development will be relevant:

- Emplacement of paved areas and roofing of buildings, which would reduce rainfall recharge to the water table (it is understood that runoff from these will be routed to the surface water disposal system).
- Emplacement of piles into the subsurface to just below the top of rock. These will be emplaced in such a way as to reduce the saturated media cross-sectional flow area to around 80% of the pre-existing condition.

Construction impacts will be cumulative (gradual installation of piles and emplacement of paving and buildings), reaching a fully developed form when the development is operational. During construction, minor introduction of major cations and anions may occur for short periods during pile emplacement.

6 Assessment of potential operational impacts

Given the small site area compared to the extent of the surrounding rural area, reduced rainfall runoff is expected to have minor impacts.

For average long-term conditions, the reduced cross-sectional flow area created by the piles will create minor localised groundwater mounding at the up-hydraulic-gradient end of the pile clusters, and minor localised drawdown at the down-hydraulic-gradient end of the pile clusters. A component of groundwater flux previously travelling through the site subsurface would be diverted around the sides of the development. No subsurface barriers appear to be present (there are no known neighbouring developments which have imposed artificial hydraulic barriers), that would inhibit this diversion. Groundwater flux to the identified GDE just to the southwest has only a slight probability of being impacted.

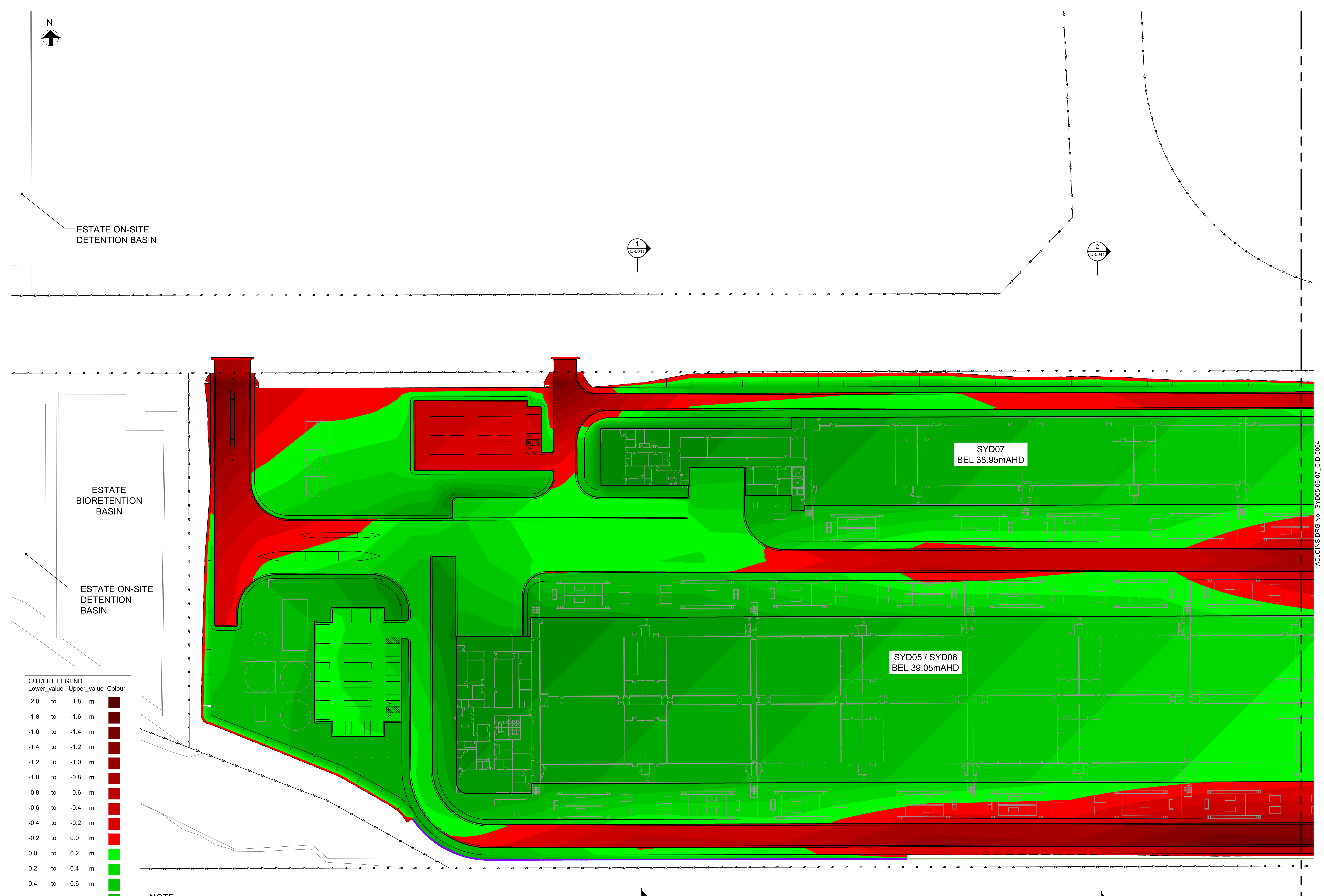
It is understood that no artificial groundwater recharge will be occurring at the site.

7 References

1. CTEnvironmental. 2018. Mamre Road South – Proposed Industrial Subdivision. Assessment of Riparian and Groundwater Dependent Ecosystems. Prepared for ALTIS Property Group Pty Ltd'.
2. Costin Roe Consulting. 2019. Overland Flow Report, SSD 9522, Mamre Road & Southern Link Rd, Orchard Hills NSW. Rev. G. May.
3. Rae DJ. 2007. Water Management in South Creek Catchment: Current state, issues and challenges. CRC for Irrigation Futures Technical Report No. 12/07. November.
4. Singh R, Nawarathna B, Simmons B, Maheshwari B, and Malano HM. 2009. Understanding the Water Cycle of the South Creek Catchment in Western Sydney, Part I: Catchment Description and Preliminary Water Balance Analysis. CRC for Irrigation Futures Technical Report 05/09. December.

Appendix C

Earthwork Plan



CUT/FILL LEGEND

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-1.6	to	-1.4	m	🟥
-1.4	to	-1.2	m	🟥
-1.2	to	-1.0	m	🟥
-1.0	to	-0.8	m	🟥
-0.8	to	-0.6	m	🟥
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1.6	to	1.8	m	🟩
1.8	to	2.0	m	🟩

NOTE:

1. FOR GENERAL NOTES REFER DRG No. SYD05-06-07_C-A-0006.
2. COMPARISON BETWEEN SSD-9522 PLATFORM LEVEL AND PROPOSED FORMATION LEVEL.
3. FORMATION LEVEL BASED ON:
   350mm BELOW STRUCTURAL FOOTPRINT
   800mm BELOW ROAD PAVEMENTS
   150mm BELOW SOFT LANDSCAPING
4. NO STRIP.
5. NO BULKING FACTORS.
6. FOUNDATIONS, UTILITY AND DRAINAGE TRENCHES EXCLUDED.
7. SITE WON MATERIAL SUITABLE FOR REUSE.

	VOLUME (m³)
CUT	37,000
FILL	46,500

Approvals

Customer	Date

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Project Title
SYD05-06-07
KEMPS CREEK

Key Plan

Drawing Title
BULK EARTHWORKS
PLAN
SHEET 1 OF 2

Scale at A0	1:500m	Drawn By	DJ
Role	CIVIL	Checked By	CL
Suitability	SSDA ISSUE	Approved By	EM
Job No	277863-00	Rev	1

Sheet number
SYD05-06-07_C-D-0003

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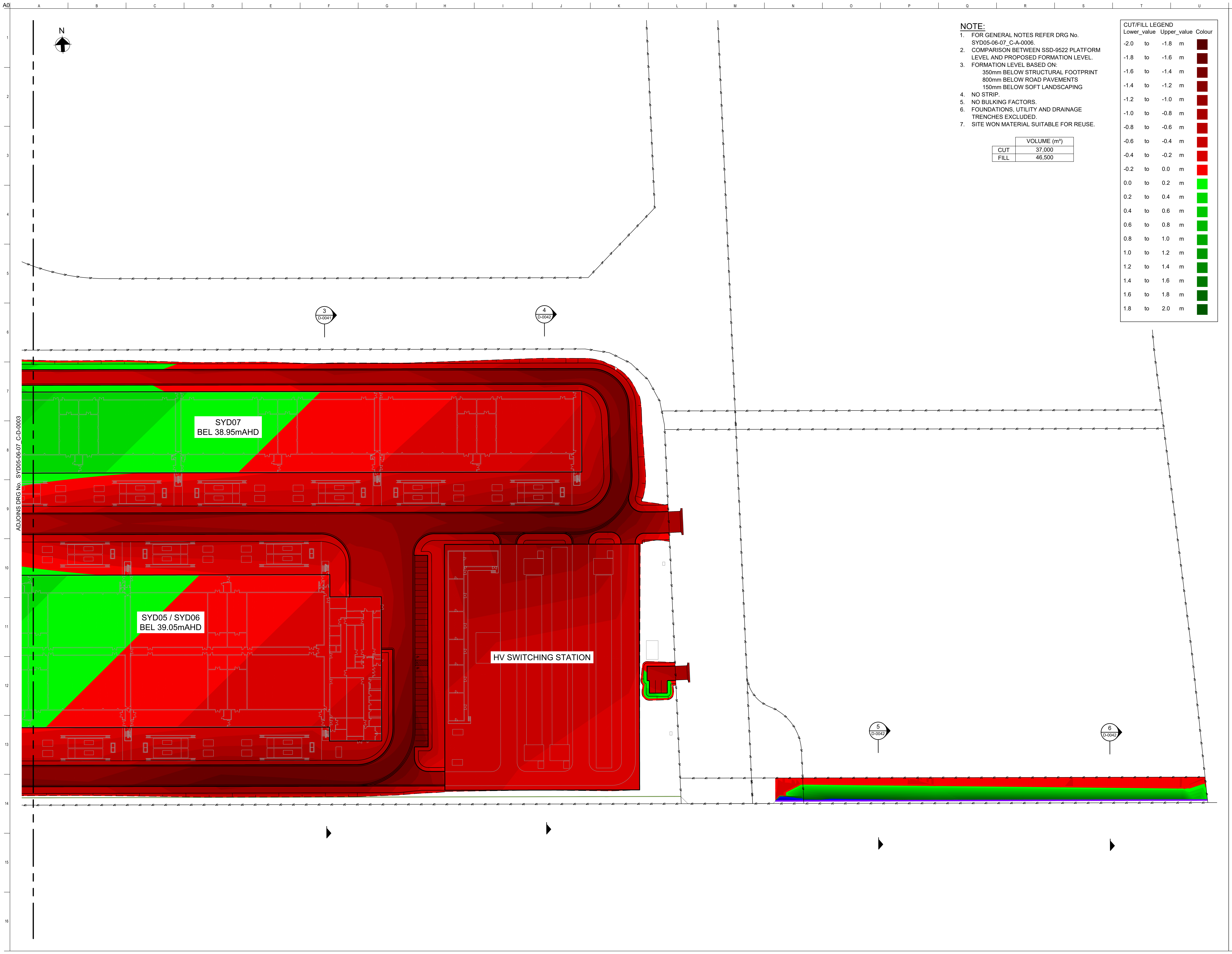

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	VOLUME (m^3)
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FILL	46,500

CUT/FILL LEGEND

Lower_value		Upper_value		Colour
-2.0	to	-1.8	m	🟥
-1.8	to	-1.6	m	🟥
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-1.4	to	-1.2	m	🟥
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1.6	to	1.8	m	🟩
1.8	to	2.0	m	🟩

Approvals

Customer Date

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BULK EARTHWORKS
PLAN
SHEET 2 OF 2

Scale at A0	1:500m	Drawn By	DJ
Role	CIVIL	Checked By	CL
Suitability	SSDA ISSUE	Approved By	EM
Job No	277863-00	Rev	1

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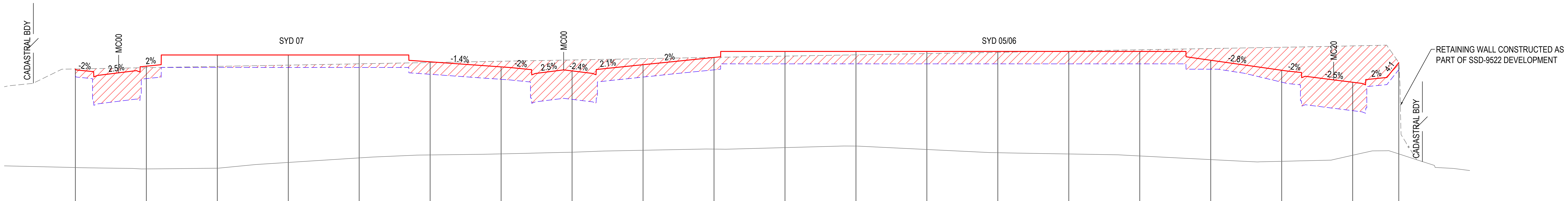

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SSD-9522 LEVELS	38.908	38.944	38.980	39.016	39.052	39.089	39.125	39.161	39.197	39.233	39.270	39.305	39.341	39.376	39.412	39.447	39.482	39.518	39.557	39.087
EXISTING LEVELS	36.133	36.094	36.115	36.277	36.406	36.488	36.518	36.565	36.620	36.652	36.695	36.737	36.641	36.551	36.515	36.460	36.357	36.309	36.479	36.517
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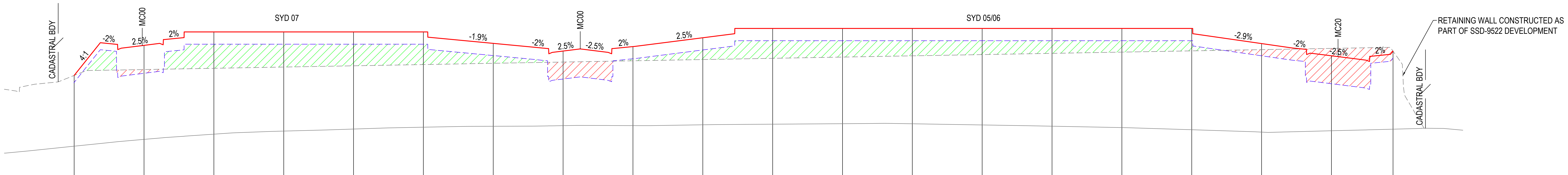

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SSD-9522 LEVELS	38.055	38.224	38.259	38.295	38.331	38.366	38.402	38.438	38.473	38.509	38.545	38.580	38.616	38.651	38.687	38.723	38.758	38.794	38.829	38.751
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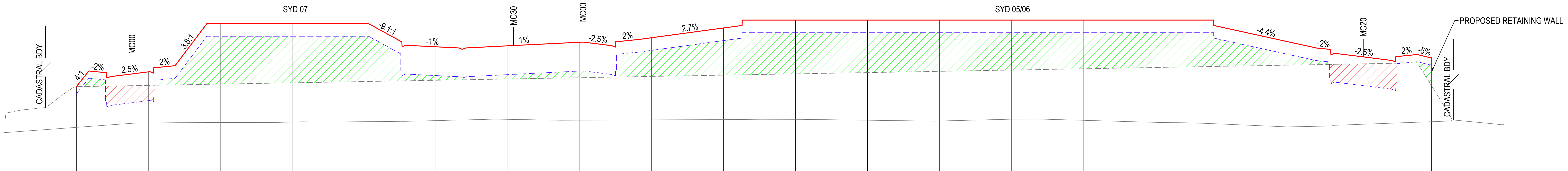
SECTION 2



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FORMATION LEVELS	37.351	37.161	38.950	38.950	38.950	37.859	37.885	37.985	38.560	38.831	39.050	39.050	39.050	39.050	39.050	39.050	38.819	38.381	37.551	37.371
SSD-9522 LEVELS	37.551	37.587	37.622	37.658	37.693	37.729	37.764	37.799	37.835	37.870	37.906	37.941	37.977	38.012	38.047	38.083	38.118	38.154	38.189	37.571
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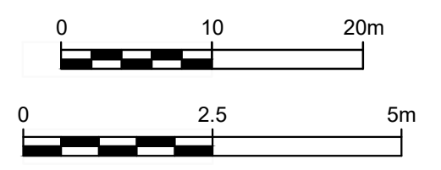

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LEGEND:

🟥	CUT
🟩	FILL

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KEMPS CREEK

Key Plan

Drawing Title
BULK EARTHWORKS
TYPICAL SECTIONS
SHEET 1 OF 2

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Role	CIVIL	Checked By	**CL**
Suitability	SSDA ISSUE	Approved By	**EM**
Job No	**277863-00**	Rev	**1**

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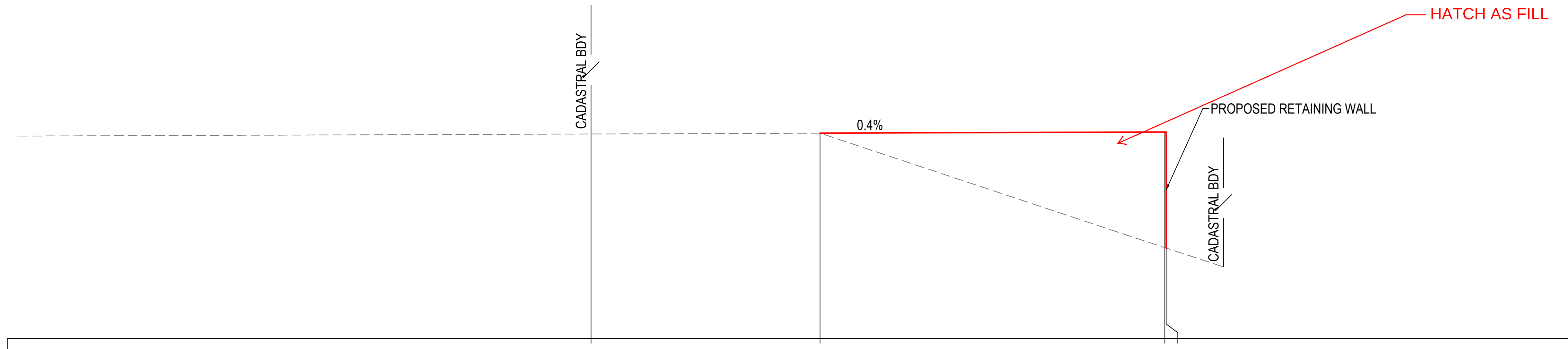

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SECTION 6
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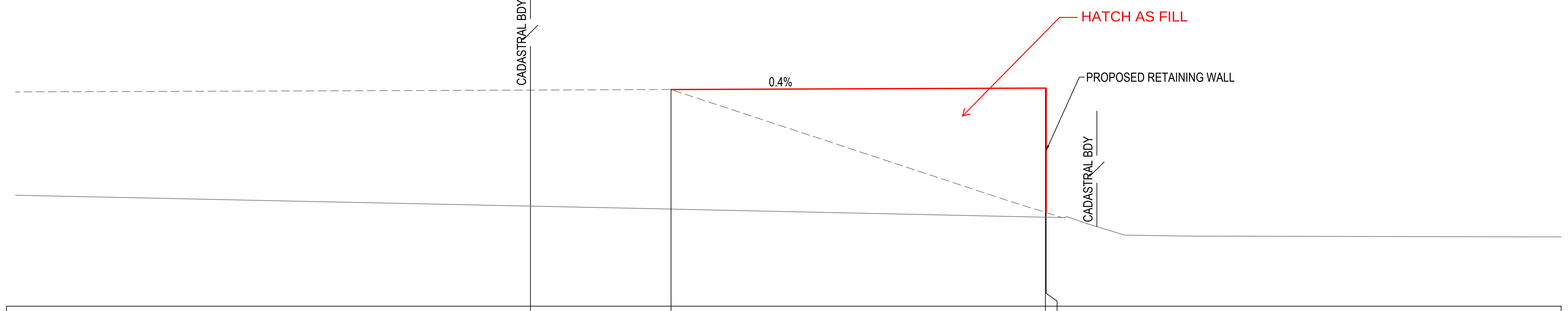

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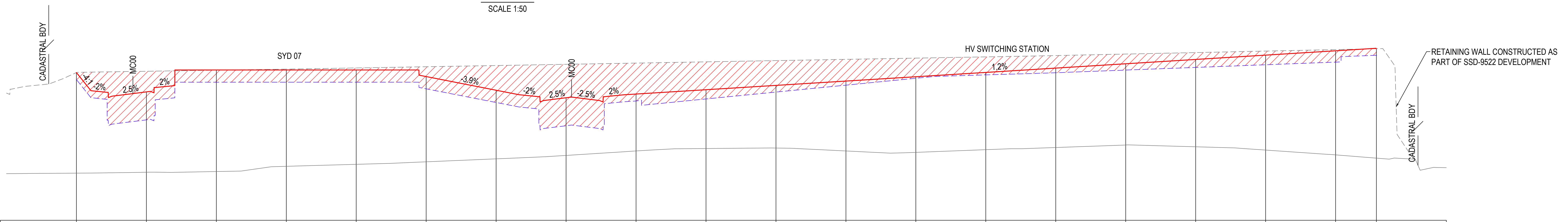
SECTION 5
SCALE 1:50



DATUM 35.0

DESIGN LEVELS	39.225	38.672	39.300	39.300	39.300	39.110	38.719	38.505	38.611	38.735	38.859	38.982	39.106	39.230	39.354	39.477	39.601	39.725	39.848	39.907
FORMATION LEVELS	39.025	37.872	38.950	38.950	38.950	38.760	38.370	37.705	38.411	38.470	38.667	38.865	39.062	39.159	39.220	39.296	39.372	39.448	39.524	39.707
SSD-9522 LEVELS	39.225	39.262	39.293	39.324	39.357	39.391	39.426	39.461	39.497	39.532	39.568	39.603	39.638	39.674	39.711	39.754	39.797	39.840	39.882	39.907
EXISTING LEVELS	36.348	36.374	36.394	36.544	36.600	36.672	36.757	36.856	36.982	37.052	37.066	36.983	36.943	37.020	37.081	37.154	37.102	37.009	36.871	36.778
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	185.833

SECTION 4

0 10 20m A0 / A1 1:250 / 1:500 HORIZONTAL

0 2.5 5m A0 / A1 1:50 / 1:100 VERTICAL AND SECTIONS 5/6

NOTE:

1. FOR GENERAL NOTES REFER DRG No. SYD05-06-07_C-A-0006.

LEGEND:

🟥	CUT
🟩	FILL

Approvals

Customer Date

General Notes:

A. This is not an installation drawing and shows design intent information only.
B. All dimensions are in millimeters (mm) unless noted otherwise. All levels are in metres (m) unless stated otherwise.
C. Do not scale; work to figures dimensions only. This drawing shall be read in conjunction with building services documents and other relevant contract documents.

Notes:

Issue	Date	Description
1	19/03/21	SSDA ISSUE

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ISO 9001 CERTIFIED QUALITY SYSTEM

Client
CONFIDENTIAL

Project Title
SYD05-06-07
KEMPS CREEK

Key Plan

Drawing Title
BULK EARTHWORKS
TYPICAL SECTIONS
SHEET 2 OF 2

Scale at A0: AS SHOWN
Drawn By: **DJ**
Role: CIVIL
Checked By: **CL**
Suitability: SSDA ISSUE
Approved By: **EM**
Job No: **277863-00**
Rev: **1**
Sheet number: **SYD05-06-07_C-D-0042**
Scale bar