



Land Contamination Review, 62 Mount Vincent Road, East Maitland, New South Wales

Prepared for: East Maitland Land 62 Pty Ltd
EP3723.001 v3 14 August 2024



East Maitland Land 62 Pty Ltd
1 Hartley Drive
Thornton NSW 2322

Attention: Brad Everett

Land Contamination Review 62 Mount Vincent Road, East Maitland, New South Wales

INTRODUCTION

EP Risk Management Pty Ltd (EP Risk) was engaged by East Maitland Land 62 Pty Ltd (East Maitland Land) to prepare Land Contamination review as part of the five stage subdivision development proposal for 62 Mount Vincent Road, East Maitland, New South Wales (NSW), legally described as Part Lot 141 DP 1225076 (62 Mount Vincent Road), Lot 8 DP855275 (6 Wilton Drive) and Part Lot 142 DP 1225076 (Gulliver Lane) (the Proposed Development).

BACKGROUND

It is understood the Proposed Development comprises of Stages 1 to 4 (western portion) which covers approximately 8.36 hectares (ha) and has been recently rezoned to Residential 1 (R1 - General Residential) and Stage 5 (eastern portion) which covers approximately 13.55 ha and is subject to a rezoning proposal for Environmental Living zoning to permit up to 11 rural residential lots. The Proposed Development also includes a proposed stormwater basin which is located in the adjacent Lot 142 DP 1225076 which is zoned RU2 – Rural Landscape.

The proposed Stage 1 to 4 areas (western portion) are located in are largely cleared grazing area where as proposed Stage 5 is in a relatively undisturbed wooded portion of the lot. It is understood the proposed Stage 5 area is located within a C3 Environmental Management zone which and will be considered as part of a separate rezoning proposal. The layout for the Proposed Development is included in **Attachment A**.

PREVIOUS INVESTIGATIONS

A number of previous investigations and assessments have been prepared for land within the proposed Stage 1 to 4 area to review the risk of contamination associated with historical activities and to determine whether the Lots can be made suitable for the Proposed Development.

A Preliminary Contamination Assessment (PCA) (Cardno 2012)⁴ and a Preliminary Site Investigation (PSI) (Cardno 2017)⁵ were commissioned for the Western Portion of Lot 141 and land to the east of Mount Vincent Road to determine the potential risk of contamination and suitability for the Proposed

⁴ Cardno Geotech Solutions Pty Ltd (Cardno) prepared a Preliminary Contamination Assessment (PCA) at the Site in December 2012 (Cardno 2012)

⁵ Cardno Geotech Solutions Pty Ltd (Cardno) then prepared a Preliminary Site Investigation (PSI) at the Site in November 2017 (Cardno 2017) for Lot 141, DP 1225076 and Lot 1012 in DP 1103879



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Development. The Cardno investigations identified that mining activities had occurred at the property and that some fill containing coal chitter was identified along the gully area in the southern area of the Western Portion. Soil testing identified elevated concentrations of total recoverable hydrocarbons (TRH) and identified asbestos containing material (ACM) fragments on the surface of the fill. The PCA (Cardno 2012) reported that the area of fill impacted by TRH and ACM was removed from the gully, tip docket were referenced, however there was no validation sampling conducted.

A Contamination Assessment (EP Risk 2019)⁶ was then prepared for the Western Portion to address recommendations in Cardno 2012 and 2017 reports, which identified elevated concentrations of TRH associated with coal fines and minor ACM fragments identified on and around a stockpile in the southern area. The EP Risk 2019 investigation also identified minor heavy metal impacts in sediments within dams. EP Risk 2019 concluded that the Western Portion could be made suitable for the Proposed Development, as TRH concentrations were suitable to remain on-site based on silica gel clean-up results (which were within the investigation guidelines), and ACM fragments would be addressed by removal during site preparation works and by implementation of unexpected finds protocols (UFP) and minor heavy concentrations in dam sediments would be addressed by dewatering, conditioning and filling during development works.

EP Risk also prepared a Rezoning Application Response letter (EP Risk 2020)⁷, for Contamination Matters following a review of the Gateway Determination application by Maitland City Council (MCC).

As the Maitland LEP (2011) mapped the Proposed Development footprint of the basin as Class 2 and Class 5 Acid Sulfate Soil (ASS) zone, development consent for work is required as the Proposed Development footprint is within 500 m of adjacent Class 1, 2, 3 or 4 that is below 5 m AHD. As the consent will likely trigger the need for ASS assessment, EP Risk was engaged to undertake an ASS assessment which included the collection and analysis of 10 natural soil samples analysed for the pH and pH field oxidation and chromium reducible suite, from four boreholes advanced to 2. 1 mBGL. Five of the ten samples tested for ASS (BH01_0.1, BH01_1.0, BH02_1.0, BH04_0.1 and BH04_1.0) reported Net Acidity above the National ASS Guidance 2018 action criteria and Titratable Actual Acidity (TAA) above the ASSMAC 1998 Guideline, indicating ASS is present at the Site. Based on the results of the ASS assessment, the preparation and implementation of an ASSMP was triggered (EP Risk 2024)⁸. The ASSMP outlines suitable methods for liming application and construction methods for future development in soil containing ASS within the natural silty sand soil.

REVIEW OF CONTAMINATION RISKS

A review of available information, including a review of aerial photographs provided in a LotSearch Report⁹, indicated the Proposed Development appeared to have been used for rural purposes since at least 1954. Off-site, historical Maps from 1941 showed a sanitary depot at the current landfill site. Pervious Cardno reports and historical maps from 1913 indicate potential for mine works 'Rathluba Colliery Pit' at and south of the Proposed Development.

⁶ Contamination Assessment (EP Risk 2019), Ref: EP1360.001, dated 8 October 2019.

⁷ EP Risk (2020) Contamination Matters Identified During Gateway Determination Review, dated 30 April 2020 (ref: EP1643.001 v2).

⁸ Acid Sulfate Soil Management Plan, Gullivers Lane, East Maitland, New South Wales, dated 14 August 2024, Ref: EP3799.001 v2 (EP Risk 2024).

⁹ LotSearch Enviro Professional search, 62 Mount Vincent Road, East Maitland, NSW, 2323, Ref LS008212, dated 30 August 2019

LotSearch and EnviroPortal¹⁰ indicated Environment Protection Authority (EPA) licenced activities and investigation areas within 1 km of the Proposed Development, including the Maitland City Council (MCC) Mount Vincent Road Landfill (a potential source of landfill gas) to the southeast of the Proposed Development and the Rural Fire Services Maitland Bushfire Control Depot (a former EPA per- and polyfluoroalkyl substances (PFAS) investigation area) to the south of the Proposed Development. Landfill gas is unlikely to be a risk given the distance to the landfill cell (400 m) which includes the proposed E3 buffer and topography which is across and down gradient of the landfill. Potential PFAS impacts from use of firefighting foams for firefighting training (if used) are also unlikely to impact Lot 141 DP 1225076 given the distance from the control centre (>200 m southeast of Proposed Development) and prevailing northwest and westerly winds for nearby weather data¹¹. However, although the Bushfire Control Depot is not identified on the current NSW EPA PFAS Investigation Program map¹², there is a low to medium risk of contamination at the proposed basin on Lot 142 DP 1225076 which is within 50 m of the proposed dam and at a similar elevation to a mapped watercourse which receives run-off from the Bushfire Control Depot.

To investigate the potential for PFAS impacts, EP Risk conducted a preliminary PFAS assessment (EP Risk 2024a)¹³, see **Attachment B**. The preliminary PFAS assessment included sampling and PFAS testing of a total of four samples from two boreholes at depths of 0.1 metres below ground level (m BGL) and 1.0 m BGL (samples BH03_01, BH3_1.0, BH04_0.1 and BH04_1.0). All results were reported below the Site acceptance criteria or below the laboratory limit of reporting (LOR). However, detectable concentrations of perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were reported above the laboratory LOR in surface soil (0 – 0.1 m BGL) at both locations tested for PFAS. Although PFAS results were reported below the Site acceptance criteria and / or below the laboratory LOR, PFOS and PFOA were detected at low levels in the surface soils and may potentially leach from soils where placed in drainage lines or within or adjacent to water courses. EP Risk recommend that surface topsoil from this area is appropriately banded and stored during construction and is not used within the basin or proposed drainage swales and preferentially used beneath handstand areas where possible.

Previous investigations (EP Risk 2019) identified elevated concentrations of TRH associated with coal fines, minor ACM fragments identified on and around a stockpile in the southern area and minor heavy metal impacts within sediments within dams. Previous investigations (EP Risk 2019) concluded that the proposed Stage 1 to 4 area could be made suitable for the Proposed Development, as TRH concentrations were suitable to remain on-site based on silica gel clean-up results, ACM fragments would be addressed by removal and clearance during site preparation works and any anthropogenic materials or further ACM would be managed by implementation of unexpected finds protocols (UFP).

¹⁰ EnviroPortal, Contaminated Land WebApp, search dated 25 August 2020

¹¹ Williamtown, http://www.bom.gov.au/cgi-bin/climate/cgi_bin_scripts/windrose_selector.cgi?period=Annual&type=9&location=61078

¹² <https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program>, as of 12 June 2024.

¹³ Preliminary Per-and Polyfluoroalkyl Substances (PFAS) Assessment, Gullivers Lane, Wilton Drive Subdivision, East Maitland, NSW, dated 14 August 2024, Ref: EP3799.002 v2 (EP Risk 2024a).

CONCLUSION

EP Risk was engaged by East Maitland Land to prepare land contamination review as part of the Development Proposal.

The desktop contamination review indicated the proposed Stage 1 to 4 areas have been historically cleared and used for rural land use. The desktop contamination review also identified EPA licenced activities and investigation areas within a 1 km of the Proposed Development including potential historical mine workings, the MCC Mount Vincent Road Landfill and the Rural Fire Services Maitland Bushfire Control Depot. Based on the available records and distance from the Proposed Development these potential off-site sources of contamination are considered to present a low risk to the Proposed Development, with the exception of the proposed dam located on Lot 142 DP1225076 which presents a low to medium risk.

Based on the desktop review EP Risk considers there is generally a low risk of contamination at the Proposed Development from on-site and off-site activities, however further assessment is required to investigate a low to medium risk of PFAS contamination in the proposed basin located within Lot 142.

EP Risk considers the Lots (Part Lot 141, Part Lot 142 and Lot 8 as shown in **Attachment A**) can be made suitable for the Proposed Development with consideration to the following recommendations:

- Review of Subsidence Advisory NSW records to review potential for historical mine workings at the Proposed Development.
- Removal of anthropogenic materials (shed and stockpiled and any non-friable ACM fragments scattered materials). Inspection and clearances following removal of any ACM and preparation and implementation of an unexpected finds protocol (UFP) during redevelopment.
- Targeted surface sampling under the shed and disused drums following removal.
- Implementation of the ASSMP (EP Risk 2024) during basin bulk earthworks.
- Manage topsoil materials during basin bulk earthworks (on part of Lot 142 DP1225076) in accordance with the preliminary PFAS assessment (EP Risk 2024a), which recommended surface topsoil is appropriately banded and stored during basin construction and is not used within the basin or proposed drainage swales and that topsoil is preferentially used beneath handstand areas where possible.

CLOSURE

Please feel free to contact the undersigned on 0448 087 817 should you have any queries.

Yours sincerely

Terry Rodgers



Yours sincerely

Associate Environmental Scientist
EP Risk Management Pty Ltd
Licenced Asbestos Assessor (LAA 01400)

Attachment A Proposed Development Plans

Attachment B Preliminary PFAS Assessment (EP Risk 2024a).

QUALITY CONTROL

Version	Author	Date	Reviewer	Date	Quality Review	Date
v1	T. Rodgers	12/06/24	P. Simpson	12/06/24	P. Simpson	12/06/24
v2	T. Rodgers	19/06/24	P. Simpson	19/06/24	P. Simpson	19/06/24
v3	T. Rodgers	14/08/24	P. Simpson	14/08/24	P. Simpson	14/08/24

DOCUMENT CONTROL

Version	Date	Reference	Submitted to
v1	12/06/24	EP3723.001 LTR 01	East Maitland Land 62 Pty Ltd
v2	19/06/24	EP3723.001 LTR 01	East Maitland Land 62 Pty Ltd
v3	14/08/24	EP3723.001 LTR 01	East Maitland Land 62 Pty Ltd

LIMITATIONS

This Land Contamination Review was conducted on the behalf of East Maitland Land 62 Pty Ltd for the purpose/s stated in the letter.

EP Risk has prepared this document in good faith, but is unable to provide certification outside of areas over which EP Risk had some control or were reasonably able to check. The report also relies upon information provided by third parties. EP Risk has undertaken all practical steps to confirm the reliability of the information provided by third parties and do not accept any liability for false or misleading information provided by these parties.

It is not possible in a Land Contamination Review to present all data, which could be of interest to all readers of this report. Readers are referred to any referenced investigation reports for further data.

Inaccessible areas are omitted from the assessment including beneath concrete slabs, beneath the subsurface, within the soil or fill, beneath floorboards, in the crawlspace of the building inside the walls of the structures and inside the roof cavity.

Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

All work conducted and reports produced by EP Risk are based on a specific scope and have been prepared for East Maitland Land 62 Pty Ltd and therefore cannot be relied upon by any other third parties unless agreed in writing by EP Risk.







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Attachment A – Proposed Development Plans



PROPOSED FIRE TRAIL 5.5m WIDE

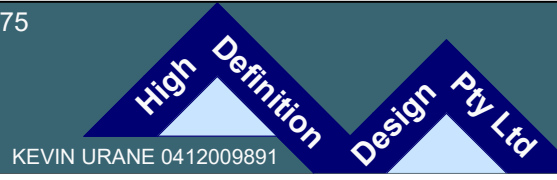
PROPOSED STAGE 4 INDICATIVE LAYOUT SUBJECT TO REZONING AND FUTURE DA APPROVAL

-  OVERHEAD POWER
-  POWER POLE
-  ZONING LINE
-  PROPOSED FIRE TRAIL
-  PROPOSED RESIDENTIAL LOTS
-  FUTURE STAGE 4 (SUBJECT TO SEPARATE DA)

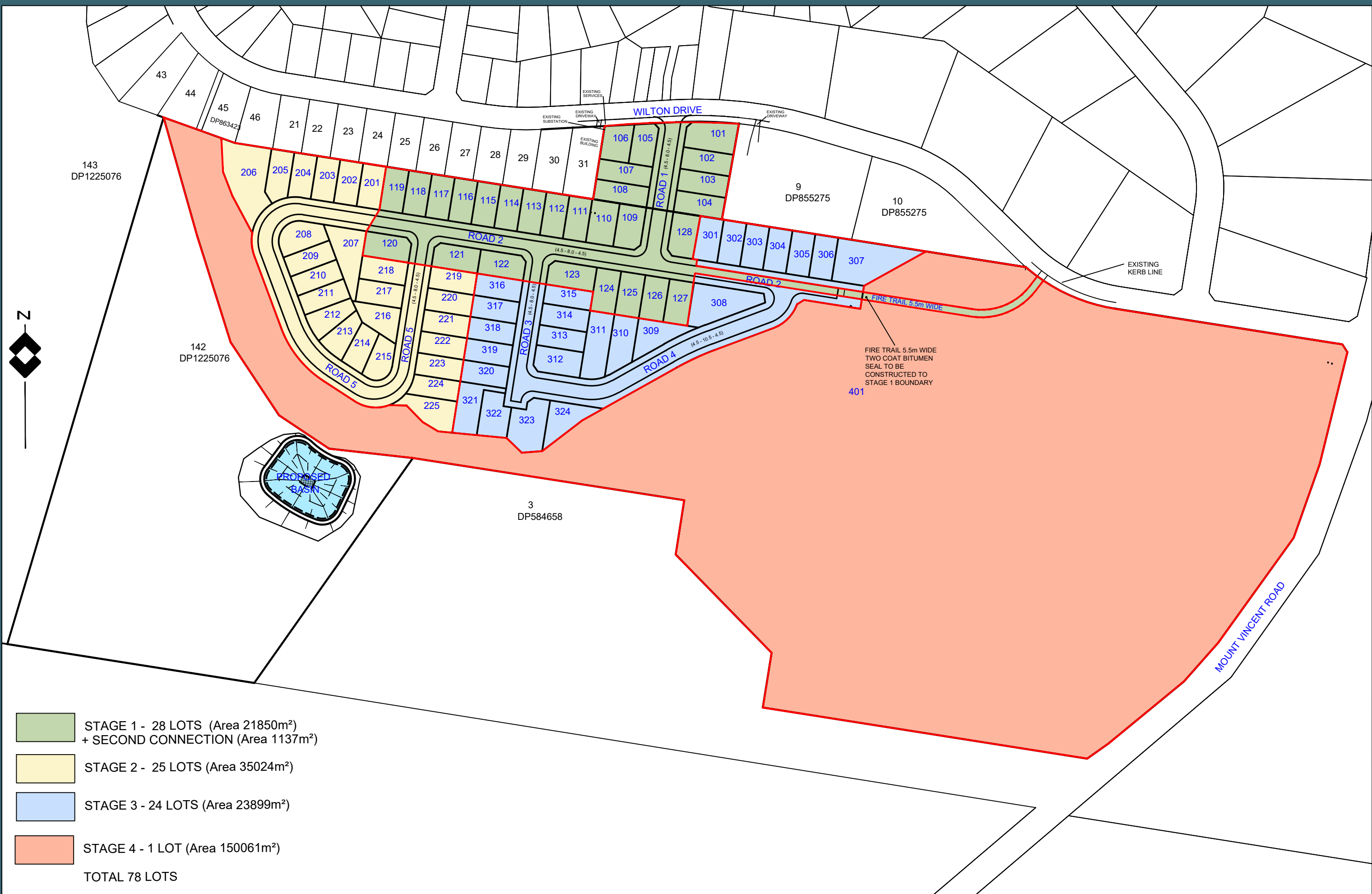
- (A) EASEMENT TO DRAIN WATER 1.5 WIDE
- (B) EASEMENT TO DRAIN WATER 3.0 WIDE
- (C) EXISTING EASEMENT TO DRAIN WATER
- (D) EXISTING EASEMENT TO FOR ELECTRICITY

TITLE: PROPOSED SUBDIVISION OF LOT 141 & 142 DP1225076 & LOT 8 DP855275
WILTON DRIVE EAST MAITLAND

OVERALL PLAN

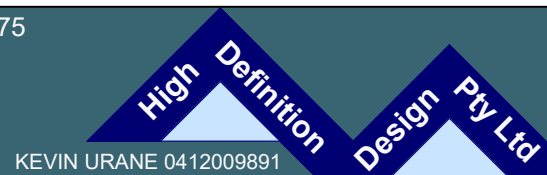


Date:	28.08.23	Scale:	1:2500 A3	Designed:	KU	Project No:	HD374
Cad Ref:	HD374 r9					Drawing No:	HD02
						Revision:	9
No	Amendment	Drawn	Date				

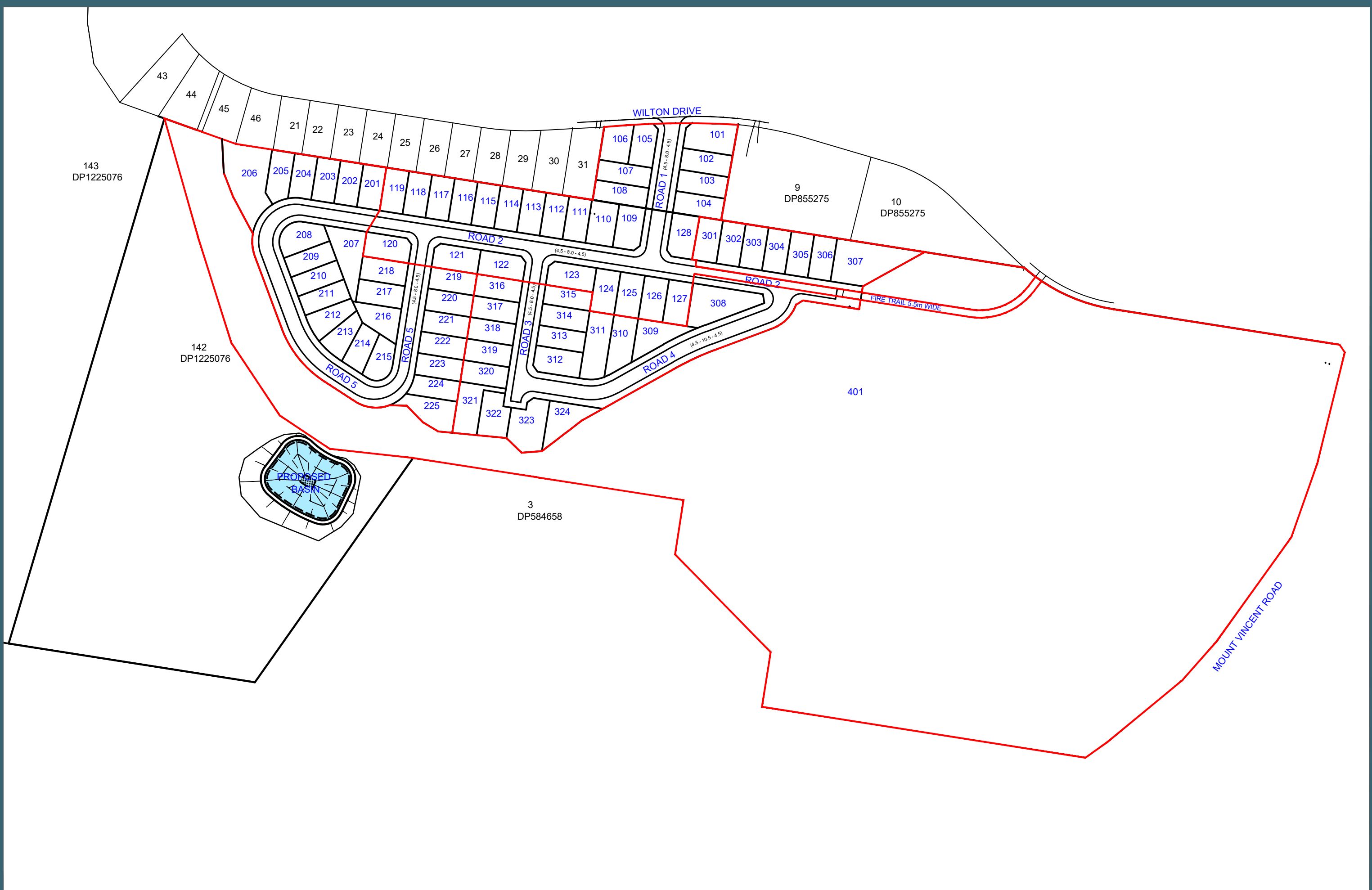


TITLE: PROPOSED SUBDIVISION LOT 141 & 142 DP1225076 AND LOT 8 DP855275
 WILTON DRIVE EAST MAITLAND

STAGING PLAN

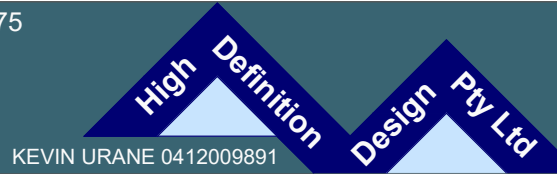


Date:	28.08.23	Scale:	1:2500 A3	Designed:	KU	Project No	HD374	
Cad Ref:	HD374 r9					Drawing No	Revision	
9	DA ISSUE			KU	16.07.24	HD03	9	
8	AMEND STAGING			KU	03.07.24			
7	AMEND LAYOUT			KU	30.04.24			
No	Amendment			Drawn	Date			



TITLE: PROPOSED SUBDIVISION LOT 141 & 142 DP1225076 AND LOT 8 DP855275
 WILTON DRIVE EAST MAITLAND

STAGING PLAN



Date:	Scale:	1:2500 A3	Designed:	KU	Project No	HD374	
Cad Ref:		HD374 boundary					
		DA ISSUE	KU	16.07.24	Drawing No	Revision	
		AMEND STAGING	KU	03.07.24			
		AMEND LAYOUT	KU	30.04.24	HD13	9	
No		Amendment	Drawn	Date			

***Attachment B - Preliminary PFAS Assessment (EP Risk
2024a)***



Preliminary Per-and Polyfluoroalkyl Substances (PFAS) Assessment

Gullivers Lane, Wilton Drive Subdivision, East
Maitland, NSW

Prepared for: East Maitland Land 62 Pty Ltd
EP3799.002 v2 14 August 2024





East Maitland Land 62 Pty Ltd
1 Hartley Drive,
Thornton, NSW, 2322

Attention: Brad Everett

Preliminary Per-and Polyfluoroalkyl Substances (PFAS) Assessment Gullivers Lane, Wilton Drive Subdivision, East Maitland, NSW

INTRODUCTION

EP Risk Management Pty Ltd (EP Risk) was engaged by East Maitland Land 62 Pty Ltd (East Maitland Land) to undertake a Preliminary Per-and Polyfluoroalkyl Substances (PFAS) assessment for the proposed stormwater basin (Proposed Development) on part of Gullivers Lane (Lot 142 Deposited Plan (DP) 1225076) East Maitland, New South Wales (NSW), as part of the five-stage subdivision development proposal for 6 Wilton Drive and 62 Mount Vincent Road Subdivision, East Maitland, NSW.

BACKGROUND

A number of previous investigations and assessments have been prepared for the adjacent land within the proposed Stage 1 to 4 sub-division to review the risk of contamination associated with historical activities and off-site sources to determine whether the land can be made suitable for residential development. EP Risk undertook a Land Contamination Review (EP Risk 2024a)¹ which identified the Rural Fire Services Maitland Bushfire Control Depot as a former NSW Environment Protection Authority (EPA) PFAS Investigation Area to the southeast and upslope of the Proposed Development. Based on the location of the proposed basin within 50 m and at a similar elevation of an existing dam and watercourse which receive run-off from the Bushfire Control Depot, the risk of PFAS contamination at the Proposed Development was considered to be low to medium. EP Risk recommended further assessment of PFAS to be undertaken for the Proposed Development.

METHODOLOGY

An experienced and qualified Environmental Scientist from EP Risk attended to Site on 30 June 2024 to inspect site conditions and undertake soil sampling. Two borehole locations were advanced via a Dingo Drill Rig and samples were collected using a dedicated pair of nitrile gloves to prevent cross contamination².

¹ EP Risk (2024a) Land Contamination Review, 62 Mount Vincent Road, East Maitland NSW, dated June 2024 (ref: EP3723.001 v2).

² Samples were collected and handled in accordance with sampling guidelines presented in Heads of EPAs (HEPA) National Environmental Management Plan (NEMP) 2.0, dated October 2019.



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T 02 9922 5021

Melbourne

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A total of four samples from two boreholes were collected at depths of 0.1 metres below ground level (m BGL) and 1.0 m BGL (samples BH03_01, BH3_1.0, BH04_0.1 and BH04_1.0). The samples were placed in a chilled cooler box with ice and transported to a NATA accredited laboratory for analytical testing.

RESULTS

All results were reported below the Site acceptance criteria or below the laboratory limit of reporting (LOR). Detectable concentrations of perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were reported above the laboratory LOR in surface soil (0 – 0.1 m BGL).

CONCLUSION

Although all results were reported below the Site acceptance criteria and / or below the laboratory LOR, PFOS and PFOA were detected at low levels in the surface soils and may potentially leach from soils where placed in drainage lines or within or adjacent to water courses. EP Risk recommend that surface topsoil from this area is appropriately banded and stored during construction and is not used within the basin or proposed drainage swales and preferentially used beneath handstand areas where possible.

CLOSURE

Yours sincerely



Terry Rodgers

Associate Environment Scientist
 EP Risk Management Pty Ltd
 ABN: 81 147 147 591

Attachments:

- Attachment 1** – Figure
- Attachment 2** – Photographic Log
- Attachment 3** – Results Summary Table
- Attachment 4** – Laboratory Report

QUALITY CONTROL

Version	Author	Date	Reviewer	Date	Quality Review	Date
v1	H. Erskine	13.08.2024	T. Rodgers	13.08.2024	P. Simpson	13.08.2024
v2	H. Erskine	14.08.2024	T. Rodgers	14.08.2024	P. Simpson	14.08.2024

DOCUMENT CONTROL

Version	Date	Reference	Submitted to
v1	13.08.2024	EP3799.002_ East Maitland _Prelim PFAS_v1	East Maitland Land 62 Pty Ltd
v2	14.08.2024	EP3799.002_ East Maitland _Prelim PFAS_v2	East Maitland Land 62 Pty Ltd



LIMITATIONS

This Preliminary Per-and Polyfluoroalkyl Substances (PFAS) Assessment was conducted on the behalf of East Maitland Land 62 Pty Ltd for the purpose/s stated in the letter.

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It is not possible in a Preliminary Per-and Polyfluoroalkyl Substances (PFAS) Assessment to present all data, which could be of interest to all readers of this report. Readers are referred to any referenced investigation reports for further data.

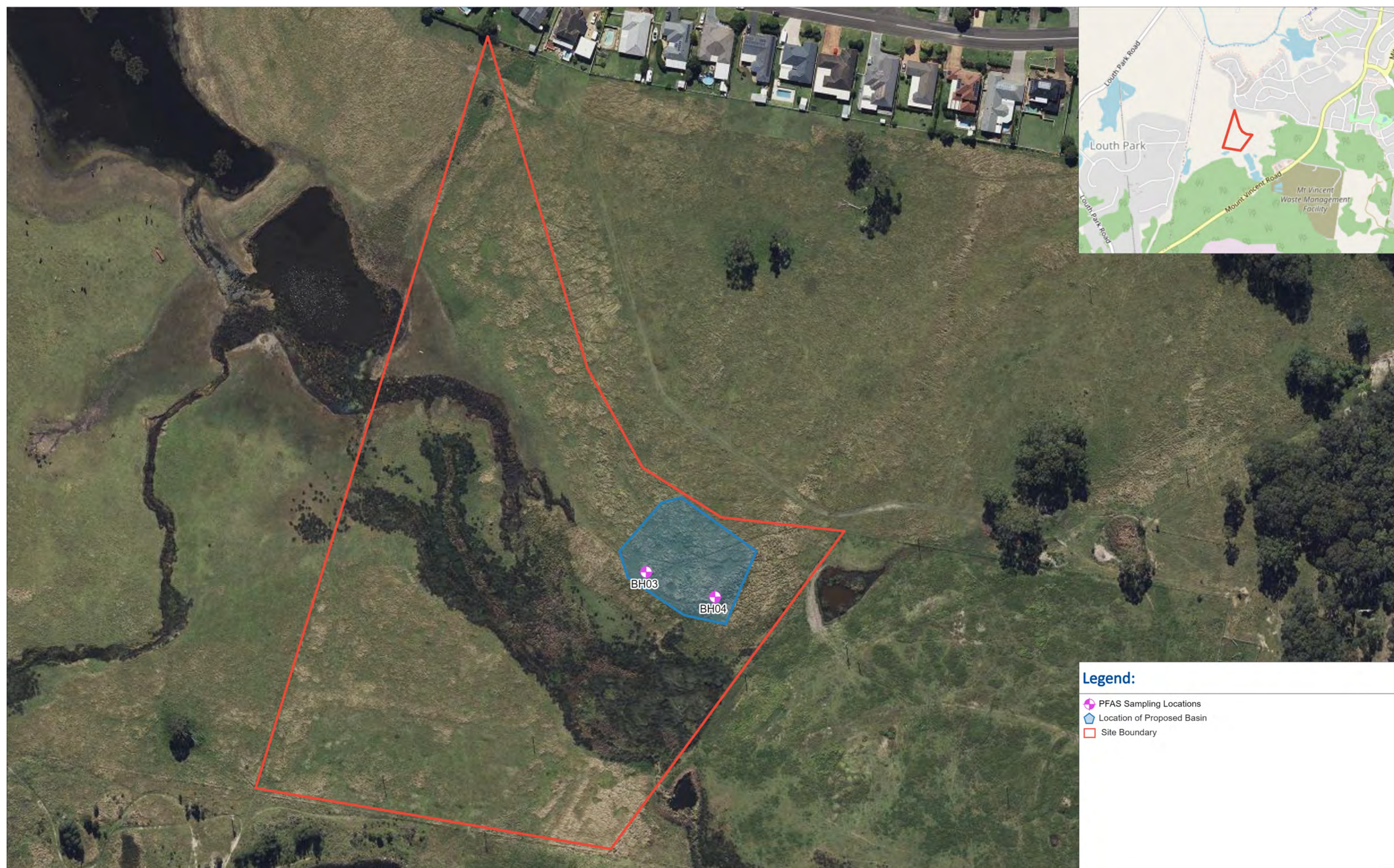
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Attachment 1 – Figure



Legend:

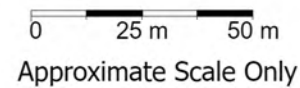
-  PFAS Sampling Locations
-  Location of Proposed Basin
-  Site Boundary

Per-and Polyfluoroalkyl Substances (PFAS) Assessment
Wilton Drive, East Maitland NSW, Australia

Job No: EP3799
 Date: 02-08-2024
 Version: v1

Figure 1 - Site and Sampling Locations

Coordinate System: WGS84
 Drawn By: HE Checked: TR
 Scale of regional map not shown



Attachment 2 – Photographic Log

		<p>Plate 1</p> <p>Description:</p> <p>BH03 Surface/topsoil material analysed for PFAS</p> <p>Date:</p> <p>30.07.2024</p>
		<p>Plate 2</p> <p>Description:</p> <p>BH04 at 1 m BGL analysed for PFAS</p> <p>Date:</p> <p>30.07.2024</p>

Attachment 3 – Results Summary Table

	Perfluorooctane sulfonic acid (PFOS)	Sum of PFHxS and PFOS	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctanoic acid (PFOA)	Perfluorobutane sulfonic acid (PFBS)	Sum of PFAS (WA DER List)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	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)	Moisture Content
	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	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.1
PFAS NEMP 2020 Human Health, HIL A (Public open space)		0.01		0.1	-	-	-	-	-	-	-	-	-	-	-
PFAS NEMP 2020 Human Health, HIL C (Public open space)		1		10	-	-	-	-	-	-	-	-	-	-	-
PFAS NEMP 2020 Ecological, Ecological direct exposure	1	-	-	10	-	-	-	-	-	-	-	-	-	-	-
PFAS NEMP 2020 Ecological, Ecological indirect exposure	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Field ID	Original Title	Depth	Sampled Date	Perfluorooctane sulfonic acid (PFOS)	Sum of PFHxS and PFOS	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctanoic acid (PFOA)	Perfluorobutane sulfonic acid (PFBS)	Sum of PFAS (WA DER List)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	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)	Moisture Content
BH03	BH03_0.1	0.1m	30-07-2024	0.0007	0.0007	< 0.0002	< 0.0002	< 0.0002	0.0007	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005	35.1
BH03	BH03_1.0	1m	30-07-2024	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005	19.5
BH04	BH04_0.1	0.1m	30-07-2024	0.0003	0.0003	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005	22.8
BH04	BH04_1.0	1m	30-07-2024	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005	17.6

Criteria adopted from the following guidelines:

¹PFAS NEMP 2020 Criteria for H/H, HIL A (Residential with accessible soil), applies should basin materials be moved onto residential lots

²PFAS NEMP 2020 Criteria for H/H, HIL C (Public open space), for footprint of the basin

³PFAS NEMP 2020 Criteria for Eco, Ecological direct exposure from table Table 3

³PFAS NEMP 2020 Criteria for Eco, Ecological indirect exposure from table Table 3

Notes:

This table does not represent the full analytical results, please refer to the laboratory results for full details.

Attachment 4 – Laboratory Report



CERTIFICATE OF ANALYSIS

Work Order : **ES2424867**
Client : **EP RISK MANAGEMENT**
Contact : MR TERRY RODGERS
Address : 3/19 BOLTON STREET
NEWCASTLE NSW 2300
Telephone : ----
Project : EP3799
Order number : ----
C-O-C number : ----
Sampler : Hayley Erskine
Site : East Maitland ASS
Quote number : ES23EPRISK0002 - ES PRIMARY WORK ONLY
No. of samples received : 11
No. of samples analysed : 11

Page : 1 of 7
Laboratory : Environmental Division Sydney
Contact : Jason Dighton
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 30-Jul-2024 16:36
Date Analysis Commenced : 31-Jul-2024
Issue Date : 06-Aug-2024 17:41



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Inorganics, Smithfield, NSW
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

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

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

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

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

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

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

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

- ASS: EA033 (CRS Suite): Analysis is performed as per the Acid Sulfate Soils Laboratory Methods Guidelines (2004) and the updated National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT (2018)
- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite): ANC not required because pH KCl less than 6.5
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO₃) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m³ in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m³'.
- ASS: EA003 (NATA Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- 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 or as per USEPA 1633 limits where LISTED. 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 and also conform to QSM 5.4 (US DoD) requirements.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH01_0.1	BH01_1.0	BH01_2.0	BH02_1.0	BH02_2.0
Sampling date / time					30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		ES2424867-001	ES2424867-002	ES2424867-003	ES2424867-004	ES2424867-005
					Result	Result	Result	Result	Result
EA003 :pH (field/fox)									
pH (F)	----	0.1	pH Unit		6.0	5.4	7.0	5.9	8.3
pH (Fox)	----	0.1	pH Unit		2.7	3.4	4.7	3.8	5.7
Reaction Rate	----	1	Reaction Unit		3	2	2	3	2
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit		5.4	4.6	5.8	5.1	6.2
Titrateable Actual Acidity (23F)	----	2	mole H+ / t		24	24	8	19	2
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S		0.04	0.04	<0.02	0.03	<0.02
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S		<0.005	0.008	0.006	<0.005	<0.005
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t		<10	<10	<10	<10	<10
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-		1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S		0.04	0.05	<0.02	0.03	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t		24	29	12	19	<10
Liming Rate	----	1	kg CaCO3/t		2	2	<1	1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S		0.04	0.05	<0.02	0.03	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t		24	29	12	19	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t		2	2	<1	1	<1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH03_0.1	BH03_1.0	BH03_2.0	BH04_0.1	BH04_1.0
Sampling date / time				30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2424867-006	ES2424867-007	ES2424867-008	ES2424867-009	ES2424867-010	
				Result	Result	Result	Result	Result	
EA003 :pH (field/fox)									
pH (F)	----	0.1	pH Unit	----	7.2	8.7	6.1	5.1	
pH (Fox)	----	0.1	pH Unit	----	5.1	5.9	3.2	3.5	
Reaction Rate	----	1	Reaction Unit	----	2	2	3	2	
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit	----	6.2	6.3	5.4	4.6	
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	----	7	<2	21	32	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	<0.02	0.03	0.05	
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	<0.005	0.006	0.009	0.007	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	<10	<10	<10	<10	
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-	----	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	<0.02	0.04	0.06	
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	<10	26	37	
Liming Rate	----	1	kg CaCO3/t	----	<1	<1	2	3	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	<0.02	<0.02	0.04	0.06	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	<10	<10	26	37	
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	<1	<1	2	3	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%	35.1	19.5	----	22.8	17.6	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	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	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0007	<0.0002	----	0.0003	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH03_0.1	BH03_1.0	BH03_2.0	BH04_0.1	BH04_1.0
Sampling date / time					30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00	30-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	ES2424867-006	ES2424867-007	ES2424867-008	ES2424867-009	ES2424867-010	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
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	
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	
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	
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 PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0007	<0.0002	----	0.0003	<0.0002	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0007	<0.0002	----	0.0003	<0.0002	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	103	90.4	----	94.2	90.4	
13C8-PFOA	----	0.0002	%	94.4	95.1	----	91.6	97.2	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Sample ID			BH04_2.0	----	----	----	----
		Sampling date / time			30-Jul-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2424867-011	-----	-----	-----	-----	
				Result	---	---	---	---	
EA003 :pH (field/fox)									
pH (F)	----	0.1	pH Unit	5.8	----	----	----	----	
pH (Fox)	----	0.1	pH Unit	3.8	----	----	----	----	
Reaction Rate	----	1	Reaction Unit	2	---	---	---	---	
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit	5.6	----	----	----	----	
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	8	----	----	----	----	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.006	----	----	----	----	
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----	
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-	1.5	----	----	----	----	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----	
Net Acidity (acidity units)	----	10	mole H+ / t	11	----	----	----	----	
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----	
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	----	----	----	----	
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	11	----	----	----	----	
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	----	----	----	----	



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry / Biology).

(SOIL) EA033-E: Acid Base Accounting

(SOIL) EA003 :pH (field/fox)

(SOIL) EA033-B: Potential Acidity

(SOIL) EA033-C: Acid Neutralising Capacity

(SOIL) EA033-D: Retained Acidity

(SOIL) EA033-A: Actual Acidity



QUALITY CONTROL REPORT

Work Order	: ES2424867	Page	: 1 of 5
Client	: EP RISK MANAGEMENT	Laboratory	: Environmental Division Sydney
Contact	: MR TERRY RODGERS	Contact	: Jason Dighton
Address	: 3/19 BOLTON STREET NEWCASTLE NSW 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: EP3799	Date Samples Received	: 30-Jul-2024
Order number	: ----	Date Analysis Commenced	: 31-Jul-2024
C-O-C number	: ----	Issue Date	: 06-Aug-2024
Sampler	: Hayley Erskine		
Site	: East Maitland ASS		
Quote number	: ES23EPRISK0002 - ES PRIMARY WORK ONLY		
No. of samples received	: 11		
No. of samples analysed	: 11		



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 Inorganics, Smithfield, NSW
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC
 * = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA003 :pH (field/fox) (QC Lot: 5968387)									
ES2424379-001	Anonymous	EA003: pH (F)	----	0.1	pH Unit	7.5	7.4	1.7	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	5.1	5.0	0.0	0% - 20%
ES2424678-004	Anonymous	EA003: pH (F)	----	0.1	pH Unit	5.8	5.8	1.7	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.3	3.4	0.0	0% - 20%
EA003 :pH (field/fox) (QC Lot: 5968388)									
ES2424867-002	BH01_1.0	EA003: pH (F)	----	0.1	pH Unit	5.4	5.2	2.5	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.4	3.4	0.0	0% - 20%
EA033-A: Actual Acidity (QC Lot: 5966346)									
EP2410037-017	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	9.8	9.8	0.0	0% - 20%
ES2424867-007	BH03_1.0	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	7	6	22.4	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	6.2	6.2	0.0	0% - 20%
EA033-B: Potential Acidity (QC Lot: 5966346)									
EP2410037-017	Anonymous	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	0.039	0.037	3.2	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	24	23	0.0	No Limit
ES2424867-007	BH03_1.0	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	<0.005	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5964214)									
ES2424846-015	Anonymous	EA055: Moisture Content	----	0.1 (1.0)*	%	7.8	10.5	28.6	0% - 50%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5959627)									
ES2424471-013	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5959627)									
ES2424471-013	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5959627)									
ES2424471-013	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit



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

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

Sub-Matrix: SOIL

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High
EA033-A: Actual Acidity (QCLot: 5966346)								
EA033: pH KCl (23A)	----	----	pH Unit	----	4.7 pH Unit	104	80.0	120
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	23.5 mole H+ / t	112	80.0	120
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 5966346)								
EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.283 % S	99.2	77.0	121
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5959627)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.3	72.0	128
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.6	67.0	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	68.0	136
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5959627)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	78.9	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.0	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.2	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.9	69.0	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5959627)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	74.4	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	106	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	93.7	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	98.0	69.2	143

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 Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number		MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5959627)							
ES2424471-013	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	85.6	72.0	128



Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5959627) - continued							
ES2424471-013	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	81.5	67.0	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	78.5	68.0	136
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5959627)							
ES2424471-013	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	86.6	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	83.0	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	78.4	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	86.8	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	76.5	69.0	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5959627)							
ES2424471-013	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	80.4	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	88.6	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	97.2	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	77.0	69.2	143



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2424867	Page	: 1 of 5
Client	: EP RISK MANAGEMENT	Laboratory	: Environmental Division Sydney
Contact	: MR TERRY RODGERS	Telephone	: +61-2-8784 8555
Project	: EP3799	Date Samples Received	: 30-Jul-2024
Site	: East Maitland ASS	Issue Date	: 06-Aug-2024
Sampler	: Hayley Erskine	No. of samples received	: 11
Order number	: ----	No. of samples analysed	: 11

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA003 :pH (field/fox)								
Snap Lock Bag - frozen (EA003)								
BH01_0.1, BH01_2.0, BH02_2.0, BH03_2.0, BH04_1.0	BH01_1.0, BH02_1.0, BH03_1.0, BH04_0.1, BH04_2.0	30-Jul-2024	06-Aug-2024	25-Apr-2027	✓	06-Aug-2024	04-Nov-2024	✓
EA033-A: Actual Acidity								
Snap Lock Bag - frozen (EA033)								
BH01_0.1, BH01_2.0, BH02_2.0, BH03_2.0, BH04_1.0	BH01_1.0, BH02_1.0, BH03_1.0, BH04_0.1, BH04_2.0	30-Jul-2024	05-Aug-2024	30-Jul-2025	✓	05-Aug-2024	03-Nov-2024	✓
EA033-B: Potential Acidity								
Snap Lock Bag - frozen (EA033)								
BH01_0.1, BH01_2.0, BH02_2.0, BH03_2.0, BH04_1.0	BH01_1.0, BH02_1.0, BH03_1.0, BH04_0.1, BH04_2.0	30-Jul-2024	05-Aug-2024	30-Jul-2025	✓	05-Aug-2024	03-Nov-2024	✓
EA033-C: Acid Neutralising Capacity								
Snap Lock Bag - frozen (EA033)								
BH01_0.1, BH01_2.0, BH02_2.0, BH03_2.0, BH04_1.0	BH01_1.0, BH02_1.0, BH03_1.0, BH04_0.1, BH04_2.0	30-Jul-2024	05-Aug-2024	30-Jul-2025	✓	05-Aug-2024	03-Nov-2024	✓



Matrix: SOIL

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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-D: Retained Acidity							
Snap Lock Bag - frozen (EA033) BH01_0.1, BH01_2.0, BH02_2.0, BH03_2.0, BH04_1.0, BH01_1.0, BH02_1.0, BH03_1.0, BH04_0.1, BH04_2.0	30-Jul-2024	05-Aug-2024	30-Jul-2025	✓	05-Aug-2024	03-Nov-2024	✓
EA033-E: Acid Base Accounting							
Snap Lock Bag - frozen (EA033) BH01_0.1, BH01_2.0, BH02_2.0, BH03_2.0, BH04_1.0, BH01_1.0, BH02_1.0, BH03_1.0, BH04_0.1, BH04_2.0	30-Jul-2024	05-Aug-2024	30-Jul-2025	✓	05-Aug-2024	03-Nov-2024	✓
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055) BH03_0.1, BH04_0.1, BH03_1.0, BH04_1.0	30-Jul-2024	----	----	----	02-Aug-2024	13-Aug-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X) BH03_0.1, BH04_0.1, BH03_1.0, BH04_1.0	30-Jul-2024	31-Jul-2024	26-Jan-2025	✓	01-Aug-2024	09-Sep-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X) BH03_0.1, BH04_0.1, BH03_1.0, BH04_1.0	30-Jul-2024	31-Jul-2024	26-Jan-2025	✓	01-Aug-2024	09-Sep-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X) BH03_0.1, BH04_0.1, BH03_1.0, BH04_1.0	30-Jul-2024	31-Jul-2024	26-Jan-2025	✓	01-Aug-2024	09-Sep-2024	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) BH03_0.1, BH04_0.1, BH03_1.0, BH04_1.0	30-Jul-2024	31-Jul-2024	26-Jan-2025	✓	01-Aug-2024	09-Sep-2024	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Chromium Suite for Acid Sulphate Soils	EA033	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	1	10	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
pH field/fox	EA003	3	29	10.34	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	16.67	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 field/fox	EA003	SOIL	In house: Referenced to Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
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).
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 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
Drying only	EN020D	SOIL	In house
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
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.

Mandatory Fields

CHAIN OF CUSTODY

CLIENT CODE: *PROJECT MANAGER: Terry Rodgers

*CLIENT: EP Risk Newcastle MOBILE: 04 48087817

OFFICE: Newcastle ALIS QUOTE # ES 28 EP RISK 0602 PURCHASE ORDER NO.:

PROJECT NO./PROJECT: EP379a ACCOUNTS @ ep.risk.com.au

INVOICE TO: accounts @ ep.risk.com.au

REPORTS TO: Terry Rodgers @ ep.risk.com.au

EMAIL: hayley.erskine @ ep.risk.com.au

*STORAGE REQUIREMENTS: Standard Storage Extended Storage **TURNAROUND** 5+ days (no surcharge) 3 day (+15%) 2 day (+30%) 1 day (+50%)

*ANALYSIS REQUIRED: PH/PH Tox, CRS Suite EA033, PFAS Short Suite EP231

LAB OF ORIGIN: LAB OF ORIGIN: NEWCASTLE

Country of Origin: (if not Australia) BIOSECURITY

Environmental Division Sydney Work Order Reference ES2424867

Telephone: +61-2-8784 8565

Additional Information: Please freeze, ASS, BOGS

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	PH/PH Tox	CRS Suite EA033	PFAS Short Suite EP231	LAB QC (Additional bottles req)	Dup	MS	Additional Information (Comment on hazards - e.g. asbestos, known high contamination)
	EP00 BH01-0.1	0.1	30.7.24	1		X	X	X				
	BH01-1.0	1.0		1		X	X	X				Please freeze
	BH01-2.0	2.0		1		X	X	X				freeze
	BH02-1.0	1.0		1		X	X	X				ASS
	BH02-2.0	2.0		1		X	X	X				BOGS
	BH03-0.1	0.1		1		X	X	X				
	BH03-1.0	1.0		2		X	X	X				
	BH03-2.0	2.0		1		X	X	X				
	BH04-0.1	0.1		2		X	X	X				
	BH04-1.0	1.0		2		X	X	X				

Refrigerated by: H. Erskine Signature: H. Erskine Date/Time: 30.07.24 17:00

Received by: Emma Soggs Date/Time: 30.07.24 17:00

Signature: Emma Soggs Date/Time: 30.07.24 17:00

Mandatory Fields

CHAIN OF CUSTODY

CLIENT CODE:

*PROJECT MANAGER:

SAMPLER:

Page 2 of 2

*CLIENT:

*PM MOBILE:

SAMPLER MOBILE:

CoC #: (if applicable)

OFFICE: (Invoiced Office)

ALS QUOTE # (Client PL/Binary)

PURCHASE ORDER NO.:



PROJECT NO./PROJECT:

STI:

*INVOICE TO: (Client default only)

CC Invoice to PM

BIOSECURITY

*EMAIL REPORTS TO: (Default to PM if blank)

*ANALYSIS REQUIRED (NB: ALS Quote No. and/or Analysis Scope Code must be listed to attract state/quarant fees) When Metals are required, specify Total/filtered bottle required or Disinfectant (filtered bottle required). Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

*** STORAGE REQUIREMENTS**

Please check box:

Standard Storage time from receipt of samples: Standard Storage Extended Storage
 Waters - 3 weeks
 Soils - 2 months
 Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND**

Please check box:

Standard Storage time from receipt of samples: 5+ days (no surcharge) 3 day (+15%) 2 day (+30%) 1 day (+50%)
 (Not all tests can be expedited; contact Client Services for more information)

Comments:

ALS Use Only
Lab ID

Sample ID

Depth

Date/Time

No. Bottles

MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)

BH04-2.0

2.0

30.7.24

1

PH / pH_{fg} x
CRS Suite EA03B

WO Sticker to go here. (ALS use only)

Lab QC (Additional bottles req.)
Dup MS

Additional Information (Comment on hazards - e.g., asbestos; known high contamination)

Receipt Detail (ALS Use ONLY)

Chilling Method: Frozen / Malted

Ice: Ice Bricks: Frozen / Thawed

None

Sample Temp at Receipt

°C

°C

°C

Security Seal intact (circle)

Yes / No / NA(Non)

Carrier Details

Con Note #

Courier/Post

Client

Package Count

Hard Eddy

Form Eddy

Boots/eg/Other

#

#

#

#

#

#

#

#

Relinquished by:

Signature:

Date/Time:

Received by:

Signature

Date/Time:

Date/Time:

Date/Time:

Date/Time:

Date/Time: